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AIR POLLUTION ABSTRACTS

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This periodical is published to inform air pollution personnel of the Environmental Protection Agency (EPA), and others, of technical literature recently accessioned by the Air Pollution Technical Information Center (APTIC). For each accession, its Abstract Number, APTIC accession number, bibliographic citation, and abstract are given. Translations are cited with their sources whenever possible. The subject fields are as follow: Emission Sources; Control Methods; Measurement Methods; Air Quality Measurements; Atmospheric Interactions; Basic Science and Technology; Effects-Human Health; Effects-Plants and Livestock; Effects-Materials; Economic Aspects; Standards and Criteria; Legal and Administrative; Social Aspects; and General and Miscellaneous. All abstracts are listed under one of the above subject fields. A subject and author index are included. This issue contains abstracts 19253 - 20048.

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Volume 3, No. 6 June 1972

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Research Triangle Park, North Carolina 27711

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INTRODUCTION

This periodical is published to inform air pollution personnel of the Environmental Protection Agency (EPA), and others, of technical literature recently accessioned by the Air Pollution Technical Information Center (APTIC). For each accession, its Abstract Number, APTIC accession number, bibliographic citation, and abstract are given.

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The serial publications (journals, periodicals, etc.) which are regularly screened for input are listed with their publishers' addresses in one issue in each volume of our abstract bulletin; the most recent list appeared in the December 1971 issue.

As another service, abstracts of all of the literature in APTIC (not just in a single issue of this periodical) on any subject related to air pollution will be provided free of charge upon request. APTIC can search information more recent than that in the current issue of this periodical because of lapse of time entailed by editorial, make-up, and printing work. More than 1400 subject index terms are available for such searching—more than those included in the subject index in each issue.

SUBJECT FIELDS AND SCOPE NOTES

1. EMISSION SOURCES

Information pertaining to an industry, process, or material associated with air pollution. Documents in this category are concerned primarily with characteristics of a specific class of emission sources including types, rates, industries; secondary coverage may include effects, control methods, etc.

2. CONTROL METHODS

Includes equipment and both specific source control and general abatement efforts. Included are documents describing the operating principles, design, operation, efficiency, etc., of equipment and methods of removing pollutants. The scope of the document can vary from a device for a specific source to an approach applicable to an entire industry—e.g., automobiles.

3. MEASUREMENT METHODS

Includes equipment as well as methods. Confined to development, testing and evaluation of pollutant determination methods (sampling, analytical, monitoring) and equipment, as such. Data obtained by use of methods in specific applications are placed in the applicable subject categories.

4. AIR QUALITY MEASUREMENTS

Pollution measurements in the ambient air, generally related to specific geographical locations, such as area surveys. Also includes general reviews of area situations and emission source inventories.

5. ATMOSPHERIC INTERACTION

All chemical and physical phenomena occurring in the atmosphere. Included is material on dispersion, air pollution forecasts, meteorological effects, topographical effects, photochemical reactions in the atmosphere, etc. Laboratory studies of photochemical reactions are assigned to Basic Science and Technology.

6. BASIC SCIENCE AND TECHNOLOGY

General discussions or data compilations for the basic physical and chemical properties of pollutants. Theoretical and laboratory studies on related chemical and biological reactions and mechanisms. Mass transfer and other basic knowledge related to process engineering applications in emission control or abatement. Excludes photochemical studies in the atmosphere and biochemical studies related to effects of air pollution.

7. EFFECTS–HUMAN HEALTH

Covers medical and epedemiological studies; biological effects other than those on plants and livestock produced by air pollutants; laboratory animal experiments.

8. EFFECTS–PLANTS AND LIVESTOCK

Effects on vegetation–crops, trees, other plants–and on livestock as distinguished from laboratory experimental animals.

9. EFFECTS–MATERIALS

Deterioration, corrosion, etc., of physical materials, buildings, and structures.

10. ECONOMIC ASPECTS

Economic implications of air pollution and its control, e.g., economic losses from pollution damage, and costs of control programs or equipment in general.

11. STANDARDS AND CRITERIA

Recommended or adopted guides, criteria and standards for allowable emission limits or pollutant concentrations, air quality, equipment characteristics, and fuels.

12. LEGAL AND ADMINISTRATIVE

Legal aspects include legislation, ordinances, rules, litigation, hearings, decisions, etc. Administration covers administrative and miscellaneous information concerning control agencies and control and research programs. Typical topics are personnel, budgets, contractural activities and program descriptions.

13. SOCIAL ASPECTS

Sociological and psychological aspects such as social attitudes, public opinion studies, public relations, and public information.

14. GENERAL AND MISCELLANEOUS

Reviews of general problems, trends and background. Documents not assignable to other categories.

ABSTRACT BULLETIN

EMISSION SOURCES

19253 APTIC NO. 37771

LEAR S STEAMER HEADS FOR SAN FRANCISCO. *Machine Design, 44(6): 24-26, March 9, 1972.*

The carbon monoxide output of Lear s steam bus is 80 ppm, less than one-hundredth as much as current automobiles, and about 10 times less than 1976 federal standards which the automobile companies say they cannot meet. Figures for the other two major pollutants, hydrocarbons and oxides of nitrogen, are also comparatively low. Lear s stream system employs a turbine engine and water as the working fluid. The entire steam system weighs half as much as a comparable diesel engine and requires no expensive tooling or exotic materials. Components of the system and a flow diagram are depicted. Lear s steam-powered bus will begin a 60-day demonstration run in San Francisco April 1, 1972.

19254 APTIC NO. 37922

THE CHEMICAL INDUSTRY IN THE NETHERLANDS. *(Die chemische Industrie in Holland). Text in German. Allgem. Prakt. Chem. (Vienna), 22(11):302-303, Nov. 1971.*

The chemical industry in the Netherlands has experienced an enormous expansion within a short period of time, and with it came environmental pollution. Since the Netherlands is a small country with a surface of 33,900 sq km and a population of roughly 13 million people, it is important to know the effect each new chemical plant has on the environment and to do something about it. Only so-called clean plants will be welcome in the future. Due to technical developments, hardly any difficulties are posed by the construction of new plants free of any pollutant emission. The natural gas deposits which were discovered in the Netherlands in the fifties and which are the largest in the world contribute a great deal to the maintenance of clean air, since it provides a clean power source for heating. By 1975 the chemical industry will consume 6.5 billion cu m natural gas, 3 billion cu m will be used as a power source, the remainder as raw material. On the average, chemical industries spend 5 to 10% of the investment costs for a new plant on environmental protection measures.

19255 APTIC NO. 37945

Ministry of Health and Welfare (Japan), Public Nuisance Section

COUNTERMEASURES AGAINST PHOTOCHEMICAL SMOG. *(Kokagaku sumoggu taisaku ni tsuite). Text in Japanese. 154p., July 1970.*

Countermeasures against photochemical smog in Japan and in the U. S. are discussed. The formation reaction and effect of photochemical smog, the concentrations of oxidants and nitrogen oxides, and the effects of smog on humans are discussed. Five items on countermeasure against photochemical smog were presented on the basis of the follow-up investigation by the National Hygienic Laboratory and data from the State Air Pollution Monitoring Station in Tokyo. The oxidants concentration in Tokyo and the nitrogen oxides concentration at State monitoring stations were shown. A comparison of nitrogen oxides concentrations in Japan and the U. S. was made. Patients complaints, air pollution and atmospheric condition on the days of the occurrence of complaints, symptoms of photochemical smog, and treatments are mentioned, classified by region health centers. Other items were the study of photochemical smog by the Ministry of Health and Welfare, controls for hydrocarbons in automobile exhaust gases, amounts of gasoline consumption, industries which deal with hydrocarbons and the amounts, oil factories, factories using organic chemicals, and places and amounts of waste disposal around Tokyo Bay.

19256 APTIC NO. 38018

SMOKE CONTROL SET-BACK. *Roy. Soc. Health J. (London), 91(1):2-3, Jan./Feb. 1971.*

Because of a shortage of a solid smokeless fuel suitable for burning in domestic fire-grates, many smoke control areas that had been planned for the United Kingdom have had to be postponed and a number that are in existence have to use smoky coal. Due partly to the establishment of smoke control areas as well as to increased use of other forms of heating energy, the emission of smoke from domestic chimneys had dropped from 1.8 million tons in 1938 to 0.7 million tons in 1969. The reason for the shortage of smokeless fuel is the reduced quantity of coke available from gas works.

19257 APTIC NO. 38094

AGRICULTURE POSES WASTE PROBLEMS. *Environ. Sci. Technol., 4(12):1098-1100, Dec. 1970.*

The increasing concentration and intensity of agricultural activities are producing many environmental problems. Animal refuse, for instance, leads to odor problems and can be a serious water pollutant because of its high biological oxygen demand. Liquid wastes from agricultural processing industries, rural domestic wastes, sediment from land, irrigation drainage water, and pesticides also affect water quality. Devegetation of land through poor conservation and agricultural practices adds millions of tons of particulate matter to the atmosphere annually. Similarly, agricultural burning produces significant quantities of particulates in addition to chemically reactive gases. Terpenes and other organic vapors that evolve from growing plants may contribute to the formation of toxic air pollutans by photooxidation with nitrogen oxides, while the dissemination of plant disease organisms by atmospheric transport causes plant, animal, and human disease. Waste utilization, erosion control practices, and soil conservation programs could effectively reduce air, water, and soil pollution.

19258 APTIC NO. 38204

Iwakuni City Government (Japan), Public Nuisance Div.

OUTLINE OF ENVIRONMENTAL HAZARD IN IWAKUNI CITY. PART 3. *(Iwakuni-shi no kogai gaikyo dai3 po). Text in Japanese. 176p., Nov. 1971.*

The environmental condition, historical development, and administrative activities related to the prevention of environmental hazards were outlined. The actual condition and control of air and water pollution, noise, vibration, and offensive odor were individually discussed. The present status of pollution sources, such as the number of air pollution sources, the annual fluctuation of the amount of fuel oil consumed, and the number of chimneys, changes in the level of contamination, the actual amount or concentration of air pollutants, and standards and countermeasures for air pollution were discussed. Sources of offensive odor and causative substances were discussed in a later part of the report. Data of various determinations and national or regional standards were added as an appendix. Measurements are given for sulfur dioxide, calcium, chlorine, particulates, and other pollutants are given.

19259 APTIC NO. 38219

NEW INCINERATION TECHNIQUES HELP FIGHT AIR POLLUTION. *Ind. Gas, 52(2)22-25, Feb. 1972.*

A smoke combuster with a temperature control system enables an auto incinerator to operate within the restrictions of a maximum reading of 1.0 on the Bacharach Smoke Chart. Dense carbonaceous smoke from the burning of rubber, plastic, cloth, urethane foam, and wiring insulation in the auto bodies exists from the incinerator at approximately 900 F and enters a refractor-lined combustion chamber. Here the smoke is mixed by an air lance and the temperature is raised to 2250 F by three banks of burners. The particulate matter is consumed on a catalytic wall below the stack. Roof-mounted incinerators at a navy fire-fighting school reduce the emission density of the heavy black smoke given off by oil fires to less than 1.0 Ringelmann. Each unit has a series of radial nozzles which direct flames toward the center of the burner. Fans direct horizontal air streams through the burners, forcing the flames into the stacks where the pollutants are ignited and consumed. A special nozzle design and baffle arrangement provide the amount of oxygen needed to completely burn the large concentration of hydrocarbons in the exhaust gases.

19260 APTIC NO. 38232

DESTRUCTION OF PLASTIC WASTES. *(La destruction des dechets de plastique). Text in French. Belg. Plast., no. 25:9-19, Dec. 1971.*

Plastics wastes in city trash, mostly discarded containers, have been wrongly blamed as air, water, and soil pollutants. About 13 lbs/yr household of plastics are collected in the trash in Belgium, more in the U. S. The volume increases by 3%/yr. In dumped trash, plastics are stable and inert as stones or glass, causing no pollution of their own. When incinerated, plastics burn with a high caloric power (5000 to 9000 calories/kg), helping more complete combustion of paper, cardboard, and other trash which generate only 1700 calories/kg. Most packaging plastics (polyethylene and polystyrene) produce only carbon dioxide and steam when burning. An exception is polyvinyl chloride (PVC) which causes escaping hydrochloric acid fumes, but no chlorine or phosgene, as previously claimed. Hydrochloric acid is also liberated when burning plastic-free trash containing vegetables, salted garbage, paper, and cardboard. Tests in Hamburg showed HCl fumes close to incinerators to be only 1/20 of the danger limit of 7700 micrograms/N cu m in 1970. However, coal was also burned in these tests, and alkaline coal ashes neutralize acid fumes. A Battelle Institute research project in Germany concluded that there is generally no pollution danger to public health caused by incineration of plastics wastes.

19261 APTIC NO. 38427

ELECTRIC VEHICLES: AGE OF THE ENTREPRENEUR. *Elec. World, 177(2):60-61, Jan. 15, 1972.*

Some highlights of the second International Electric Vehicle Symposium and Exposition held late in 1971 at Atlantic City, N. J., are presented. In sharp contrast with the first symposium, when concepts abounded but vehicles were lacking or untried, the atmosphere during this symposium was charged with a desire to sell products. Seven companies are indicated which will be building electric vehicles. The use of a three-phase ac motor by Graybar-Linear Alpha is considered one of the more sophisticated conceptual approaches. However the symposium speakers did not indicate that any great breakthrough in battery technology was imminent. The Lansing, Mich. Board of Water and Light also announced the four bidders in the city s program to buy six electric buses with the help of a $144,000 grant from the Department of Transportation. The electric vehicles will reduce particulates, hydrocarbons, nitrogen oxides, carbon monoxide, and carbon dioxide and increase sulfur dioxide.

19262 APTIC NO. 38479

DOMESTIC HEATERS ARE INDISPENSABLE AT THE MOMENT. OVERHEATED SWITCH TO NATURAL GAS OR ELECTRICITY DOES NOT FIT INTO THE CONCEPT. *(Noch geht s nicht ohne Hausbrand. Ueberstuerzte Umstellung auf Erdgas oder Strom passt nicht in das Gesamtkonzept). Text in German. VDI (Ver. Deut. Ingr.) Nachr. (Berlin), 26(1):18, Jan. 1972.*

Efforts by the authorities to get the private households to switch from coal and oil heaters to gas and electric heating could lead to a breakdown of their heat supply. The fuel consumption by private households amounted to 58 million tons in 1970. 20.5 million tons were solid fuel, 31.5 million tons were fuel oil, and only 6.8 million tons were gas, electricity and remote heating. The gas, electricity and remote heating companies just do not have the capacity to cope at the moment with the supply of a number of new consumers. The switch to gas and electricity, as well as to remote heating, has been urged by the the authorities to reduce air pollution. But any such switch must be well planned, otherwise the gas connections and the heaters will be installed in vain. This was the case in Villingen. Here the authorities had to learn that the companies were unable to supply the newly installed gas and electric heaters with power because it was beyond their present capacity.

19263 APTIC NO. 38615

Barnea, Matei and Pascu Ursu

PROCESSES AND SOURCES OF AIR CONTAMINATION. *(Procese si surse de impurificare aerului). Text in Rumanian. In: Protectia atmosferei impotriva impurificarii cu pulberi si gaze. Bucharest, Romania, Editura Tehnica, 1969, Chapt. 1-6, p. 10-128. 86 refs.*

Seventy-four main air pollutant sources located in 40 populated areas were identified in Romania according to an inquiry carried out in 1966. These sources include mineral fertilizer manufacturing plants, inorganic and organic chemical processing plants, rubber and synthetic fiber manufacturing, metallurgical processing, paper manufacturing, and thermal power plants. Basic factors affecting air pollution and selfpurification processes are discussed in terms of source, meteorological conditions, and topographic interactions. Emission and dispersion of solid and gaseous air pollutants is analyzed in relation to the height of stacks and to meteorology. Included are alignment charts developed according to Stuemke for the design of stacks.

19264 APTIC NO. 37969

Bovalini, Enrico and Ariel Paggi

ON THE FORMATION OF GRAPHITIC CARBON BY HYDROCARBON COMBUSTION AND ON THE PROBABLE EFFECT OF TEMPERATURE. *(Sulla formazione di carboni grafitici per combustione di idrocarburi ed eventuale influenza della temperatura). Text in Italian. Inquinamento, 13(7):41-44, Sept. 1971. 2 refs.*

It is commonly accepted that following pyrolysis, acetylene and its polymers play a fundamental role in carbon formation; especially at low and at medium temperatures carbon formation reactions are dominated by the presence of diacetylene (C2H4). At low temperatures (500-1000 C), condensation through dehydrogenation of aromatic or of unsaturated aliphatic hydrocarbons predominates. Agglomerates form in which crystals aggregate in a disorderly manner. At intermediate temperatures (800-1700 C) an almost graphitic structure results. The formation of a graphitic structure depends on temperature and on the type of combustible, not on time of exposure to carbonization. Smoke obtained at temperatures above 900 C yields particles of a diameter of around a micron or smaller which orient themselves in a preferential direction.

This was also observed in automobile exhaust gases. Results of experiments with a Citroen, Fiat, and Renault automobile indicate that in motors fueled by enriched fuel mixtures, where high temperatures are generated, carbon formation results from low polymers (consisting of a few carbon atoms) of a molecular weight approaching that of low multiples of acetylene. At temperatures between 600 and 1000 C larger polymers form, resulting in larger carbon crystals, where orientation and thus graphite formation is impossible.

19265 APTIC NO. 37952

Cremer, Helmut

THE REACTION KINETICS OF THE METHANE-OXIDATION. *(Zur Reaktionskinetik der Methan-Oxidation). Text in German. Chem. Ing. Tech., 44(1+2):8-15, Jan. 1972. 31 refs. (Presented at the VDI-Fachgruppe Energietechnik, Verbrennung und Feuerungen und der Deutschen Vereinigung fuer Verbrennungsforschung, Stuttgart, West Germany, Oct. 7-8, 1971.)*

The oxidation of methane with oxygen and with air has been theoretically studied by means of an extensive reaction mechanism. The reaction mechanism of the methane oxidation was studied for homogeneous, adiabatic systems at constant pressure. The mixture fuel/oxidizer was considered to be a mixture of ideal gases. The calculations were carried out for stoichiometric mixtures (lamda equals 1). A method for numerical integration of the system of ordinary non-linear differential equations was selected. The formation of oxides of nitrogen was particularly considered. The results permitted the conclusion that the formation of oxides of nitrogen sets in early at the oxidation reactions with air as an oxidizer. The longer reaction times for the fuel/air oxidation as compared to the oxidation processes with pure oxygen cannot be explained solely by the diluting effect of the nitrogen. The nitrogen reactions have a slowing-down effect on the reaction mechanism. From a comparison of the temperature characteristics and the discussion of affinity, as well as from the comparison of reaction speeds, it was concluded that oxides of nitrogen are formed throughout the reaction process. The theoretical study of the methane oxidation was carried out in order to gain a better understanding of the formation of the oxides of nitrogen with a view to finding ways of controling the NOx formation in combustion engines.

19266 APTIC NO. 38307

Davis, J. B.

POLLUTION -- THE EUROPEAN SCENE. *Polym., Paint Colour J., 161(3810):82-86, Jan. 19, 1972. 8 refs. (Presented at the Chemical Coaters Association, Conference on Pollution, Chicago, Ill., Dec. 1971.)*

Governments in all European countries have been alerted to the dangers of pollution, and in consequence stricter regulations are inevitable. The paint industry will have to meet these changes by reformulation, redesign of equipment to eliminate all forms of pollution, and better housekeeping. The four areas of pollution that concern the industry are vapor emissions during manufacturing and use; the emission of noxious odors from resin manufacturing and the storing of industrial paints; contamination of waterways by liquid waste; and the disposal of solid waste. Both thermoset and thermoplastic nonaqueous dispersion enamels will materially assist control of air pollution. Powder coatings and water-based enamels and primers also help to reduce the solvent hazard. The solution to the problem of liquid waste appears to be use of multiple settling tanks for removal of suspended solids, with control of pH prior to discharge. The destruction of organic contaminants and surfactants by natural bacteria is being studied. Solid waste, except plastic, is preferably disposed of by incineration. The answer to the problem of plastic containers may be to use them as the basis for new surface coatings. Decisions concerning the degree and nature of pollution control and abatement will require comprehensive cost-benefit calculations. The industry must take part in these decisions and calculations.

19267 APTIC NO. 38354

Dumoutet, P., J. Gaget, and M. Nomine

FORMATION OF NITROGEN OXIDES DURING COAL COMBUSTION. *(Formation des oxydes d azote au cours de la combustion du charbon). Text in French. Pollut. Atmos. (Paris), 13(52):276-288, Oct./Dec. 1971. 12 refs.*

The formation of nitrogen oxides in three types of flames was studied in a powdered coal furnace. The flames were from the combustion of thick bituminous coal at strong excess air; the combustion of bituminous coal at weak excess air; and the combustion of fine anthroacite coal at very week excess air. Local nitrogen oxide concentrations were correlated with other important combustion characteristics at each point: temperature; concentrations of carbon monoxide, carbon dioxide, oxygen, and unburned solids, and axial speed of gas. The local nitrogen oxide concentrations were far higher than predicted by a kinetic bimolecular equation, but did not generally reach levels corresponding to the thermodynamic balance. The influence of combustion regulation conditions on the final nitrogen oxide concentration at the health exit was also studied. The concentration at this point (250-650 ppm) is a complex function of the nature of the coal, excess air, burner design, and flame turbulence.

19268 APTIC NO. 38084

Dybcryuska, Cristina

ENVIRONMENTAL PROTECTION IN POLAND. *(La difesa dell ambiente in Polonia). Text in Italian. Inquinamento, 13(10:37-39, Dec. 1971.*

Three million tons of gaseous pollutants (not counting carbon dioxide) are emitted yearly into the atmosphere of Poland, of which 90% are sulfur oxides. Five million tons of particulates are emitted. This pollution is emitted over only 3-5% of Polish territory. In Upper Silesia, the emission exceeds by several times the maximal permissible emission of 250 t/sq km. The power industry is the main polluter, its share of gaseous pollutants is 52% and of particulates 46%. In the Katowice agglomerate, emission amounts to 300 kg SO2/inhabitant/yr and 1100 kg SO2/ha. An increase of the current power output of 14000 MW to 100,000 MW is planned for the year 2000. Even if these new power plants were evenly distributed over the entire territory of Poland, it would still mean an increase from the current power output of 0.22 MW/sq km to 0.35 MW. A plan has therefore been devised to reduce SO2 in combustion residues to a permissible level of 0.3 mg/cu m. Current emissions exceed this norm by 0.3 mg/cu m sometimes reaching levels of up to 9 mg/cu m. Perhaps with an increase of combustion temperature above 1600 C, nitrogen oxide emissions will be reduced. A government authority has been set up to coordinate and supervise activities of the numerous specialized agencies dealing with pollution problems. The costs of pollution control are now being considered and included in state planning, thus increasing considerably the cost of further industrial expansion. The inclusion of these costs decisively affects decisions concerning investments and production.

19269 APTIC NO. 37996

Escourrou, R.

THE SCOURGE OF POLLUTION. *(Le fleau de la pollution). Text in French. Papeterie, 93(11):1025-1026, 1029-1032, 1035-1038, 1041-1045, Nov. 1971.*

Air, water, and noise pollution are discussed. Dust generation is discussed, with particular emphasis on cement works. Gaseous pollutants include sulfur dioxide, fluorine derivatives, carbon monoxide, and odors (from spray painting shops, animal food production, and motor vehicle exhausts). The sampling of air is briefly described, as well as methods of determining concentrations of sulfur dioxide, fluorine, and dust. Water pollution, effects on fish, and sources of water pollution are discussed. Pollution of the sea by atomic fallout, residual oil effluents from coastal industries, and the discharge from sewers is discussed. A suggested permissible noise limit for city conditions would be 80 to 85 decibels. A motor vehicle traveling at 50 mi/hr exceeds this noise level.

19270 APTIC NO. 38038

Eshleman, Alan, Sanford M. Siegel, and Barbara Z. Siegel

IS MERCURY FROM HAWAIIAN VOLCANOES A NATURAL SOURCE OF POLLUTION? Nature (London), 233(5320):471-472, Oct. 15, 1971. 7 refs.

Air samples collected in the Sulfur Banks within the Hawaii Volcanoes National Park and in two control areas were analyzed for mercury by atomic absorption spectrophotometry. The control samples were taken in a valley with light traffic and no industry and in an urban area close to heavy traffic. The tabulated results show that the active volcanoes on the island of Hawaii produce significant amounts of mercury. Ninety-eight percent of the mercury issuing from the Hawaiian fumaroles was in the form of a gas or particles less than 0.3 micron in diameter. The magnitude of the mercury content in the fumarole discharges agreed quite well with reports from thermal area in Kamchatka and the Kuriles.

19271 APTIC NO. 38522

Fersen, Olaf von

THE ROTATING COMBUSTION ENGINE TODAY. RO 80 HAS OVERCOME BEGINNER S MISTAKES, CONTINUOUS EXISTENCE OF THE MODEL IN QUESTION. *(Der Kreiskolbenmotor heute. Ro 80: Kinderkrankheiten ueberwunden, Weiterbestand des Modells in Frage gestellt). Text in German. VDI (Ver. Deut. Ingr.) Nachr. (Berlin), 26(1):6, 7, Jan. 1972.*

There are indications that the RO 80 as car model will go out of existence but the rotary piston engine will continue to gain increasing interest at home and abroad, primarily because of the problem of exhaust gas decontamination. The rotary piston engine operates with low-lead or unleaded gasolines without great reduction of the engine power. The shape of the combustion chamber, which is theoretically an unfavorable one, helps to keep the development of oxides of nitrogen low. The carbon monoxide and hydrocarbon contents are rather high, but they can be easily removed by afterburning. The relatively high temperature of the exhaust gases greatly aids afterburning. The pollutant concentrations in the exhaust gases of the rotary piston engine plus thermal reactor are much lower than the limit values set by the Europe test: 6.5 g/test instead of 13 g/test for CH and 90 g/test instead of 182 g/test for CO.

19272 APTIC NO. 38657

Fuhrmann, N.

PROBLEMS OF ENVIRONMENTAL PROTECTION IN BASIC-INDUSTRY PROCESSING PLANTS. *(Probleme des Umweltschutzes bei verfahrenstechnischen Anlagen der Grundstoffindustrie unter besonderer Beruecksichtigung gesetzlicher Vorschriften zur Luftreinhaltung und Laermbekaempfung). Text in German. Aufbereitungs-Technik, 12(12):757-763, Dec. 1971. 25 refs.*

Branches of industries such as cement plants, soft and hard coal briquetting plants, cokeries, and iron ore sintering plants are large air polluters. Great efforts have been undertaken to reduce emission. In the cement industry, for instance, the average dust emission dropped from about 3.5% in the year 1950 to 0.15% of the clinker production in 1967. Over the same period the clinker production rose from 11 million tons to 33 million tons. The technical directives limit the dust emissions by cement grinding stations to 150 mg/cu m. The gaseous emissions from cement plants are negligible. The soft coal briquetting plants of the German Democratic Republic emitted about 260,000 tons of dust in 1967. In hard coal briquetting plants the emission of benzo-3,4-pyrene must be mentioned in addition to the dust emission. Cokeries emit dusts, tar aerosols, and gases, particularly hydrogen sulfide and sulfur dioxide. In 1956 the SO2 emission by these plants amounted to 56,000 tons. Through scavenging of the gases, the SO2 emissions can be greatly reduced. In iron ore sintering plants, dust and SO2 are emitted. The SO2 concentration in the uncleaned gas may reach 10 g/cu m. At an annual production of 20 million tons of sinter, about 210,000 tons of SO2 are emitted. These plants also emit fluorine. The federal government drafted a law expanding its constitutional rights to include the fields of water pollution, maintenance of clean air, and noise abatement. Emission limits for basic industry processing plants are included in the technical directives pertaining to air.

19273 APTIC NO. 38022

Giaume, L., E. Godani, and B. Nardi

ATOMIC ABSORPTION DETECTION OF TRACE AMOUNTS OF LEAD IN LIGHT DISTILLATES. *Text in Italian. Riv. Combust. (Milan), 25(11):509-512, Nov. 1971. (Presented at the Symposium on Developmental, Analytical, and Instrumental Chemistry in the Petroleum Industry, Rome, Italy, May 27-28, 1971.)*

Lead present as lead alkyls in low concentrations (50-500 micrograms/kg) in light petroleum distillates (e.g., solvents, naphthas, and gasolines) is determined by direct combustion of the sample in the burner of an atomic absorption spectrophotometer, followed by measurement of absorbance at 2833 A. The measured absorbance is then compared with a blank having a lead content below 10 micrograms/kg. The method is rapid and has satisfactory accuracy and repeatability. However, the spectrophotometer response is affected by tetraethyl lead and tetramethyl lead radicals and other organolead compounds.

19274 APTIC NO. 38360

Grotewold, Gerd

SULFUR IN GERMAN NATURAL GASES AND ITS REMOVAL. *(Schwefel in deutschen Erdgasen und seine Entfernung). Text in German. Gas Wasserfach Gas Erdgas (Munich), 113(2):73-80, Feb. 1972. 16 refs. (Presented at the Erfahrungsaustausche der Gas-Chemiker, Konstanz, West Germany, 1971.)*

For the desulfurization of sour gases in Germany, four plants are in operation. With the exception of the Dorsten plant, all desulfurize rich-sour gases. Only the NEAG II plant produces a gas with a residual hydrogen sulfide concentration of less than 5 mg/cu m. Three of the four plants produce liquid, pure elemental sulfur in the Claus process, one plant produces sulfuric acid as the product. The Dorsten plant uses the Alkazid scrubbing process for the removal of H2S. The natural gas desulfurization plant NEAG I uses the Purisol method which is based on the treatment of the gas with an organic solvent (Lurgi N-Methylpyrrolidon). The method has been described in detail earlier. A cleaned gas with an average residual H2S concentration of 2000 to 3000 ppm is obtained. The plant in Dueste operates with the Selexol method which uses the dimethyl ether of the polyethylene glycole as a scrubbing agent. The NEAG II plant has two stages. On the first stage an Alkazid scrubber is used, on the second stage, a Selexol scrubber. With this two-stage method an extremely low H2S concentration of 2 to 3 ppm is obtained, while enough carbon dioxide remains in the gas to meet the required Wobbe-number. Three further desulfurization plants are under construction in Germany. Two plants will operate by the Sulfinol process which uses an aqueous solution of diisopropanolamine and tetrahydrothiophene dioxide. The third plant will use the Purisol method. All described plants invested about 10% of the total investments into facilities for waste gas cleaning and water purification. The installed facilities have a cleaning efficiency of 99%.

19275 APTIC NO. 38613

Hagman, Folke

SAVE ENVIRONMENT BY IMPROVED HEAT INSULATION. *(Spar miljo med battre varmeisolering). Text in Swedish. Tek. Tidskr., 101(17): 24-26, 28 31, Oct. 1971. 11 refs.*

Considerable amounts of heat could be spared by proper heat insulation of homes and buildings. Heat losses in the form of heat transfer amount to 1/2, and those due to ventilation and hot water to 1/4 each of the energy utilized. Measurements on front walls with additional heat insulation showed improvement of the coefficient of heat transmission from 0.74 to 0.33, and savings in thermal power requirement of 38%. As the harmful effects of air pollution are in proportion to power consumption, reductions in thermal power requirement due to better heat insulation have positive effects regarding environmental protection. In the case investigated, sulfur dioxide emissions by the central heating station dropped by 3.5 t/yr related to a fuel oil with 2% of sulfur. Another financial effect of proper heat insulation is decreased degree of acidification in soils and lakes. Thus, heat insulation is one of the environmental protection techniques. Harmonized energy and environmental protection policy is required to reduce the harmful effects of energy production in a complex manner. Better heat insulation, improvement and development of heating systems, utilization of energies present in the environment, and integrated planning of heating and ventilation systems are some of the possibilities to reduce power consumption, in home heating and industries alike.

19276 APTIC NO. 38400

Hatch, D.

POSSIBLE ATLERNATIVES TO ASBESTOS AS A FRICTION MATERIAL. *Ann. Occupational Hyg., vol. 13:25-29, 1970. (Presented at the Conference on Exposure to Asbestos during Brake and Clutch Maintenance, Brentwood, England, March 1969.)*

The use of asbestos as a friction material for disc brake pads and clutches in cars and possible alternatives with respect to health impairment due to exposure to asbestos are considered. In drum brake linings of normal configuration used for passenger cars and commercial vehicles, there exist no substitutes for asbestos which would not result in a deterioration of performance and strength. There is a drift, however, toward the use of smaller quantities of asbestos in friction materials as a result of a number of purely performance considerations and design changes. Factors to be considered in the exposure to asbestos during brake and clutch maintenance must include the durability of friction materials, the type of asbestos used with respect to chemical composition and decomposition, and the influence of heat. As the durability of the brakes improves, further reductions will occur in the percentage of asbestos which survives the wear process, because each particle of asbestos is then subjected to more heat treatment. Under pressure of necessity, possible replacements could include glass fiber, steel wool, mineral wool, carbon fibers, sintered metals, and cermets.

19277 APTIC NO. 38028

Hoshikawa, Masami, Masaji Takuma, and Nagahisa Nagae

SULPHUR BURNER. *(Io nensho sochi). Text in Japanese. Nenryo Kyokaishi (J. Fuel Soc. Japan, Tokyo), 49(517):253-261, May 1970. 10 refs.*

A spray-type sulfur combustion device was developed to burn large quantities of excess sulfur regenerated at oil refineries. The device will replace conventional evaporation-type burners, such as the checker and pan types, that are used to burn exploited and purified natural sulfur to generate sulfur dioxide gas. Because of the chemical and physical properties of sulfur, there is a need to develop powerful combustion devices such as rotary, ultrasonic, and oxygen-injection burners.

19278 APTIC NO. 38626

Iliff, Neil

ORGANIC CHEMICALS IN THE ENVIRONMENT. *New Scientist, 53(781):263- 265, Feb. 3, 1972.*

World-wide, up to 20,000,000 tons of manufactured organic chemicals enter the environment annually. The majority of organic chemicals are either processed in their place of manufacture or are used to synthesize end-products. Of the balance, the greater part are processed to produce such products as solvents, glycols, and detergents. The latter, i.e., the solvents such as methanol, ethanol, alcohols and their derivatives, glycol ethers, chlorinated solvents and chlorofluorocarbons, account for about half of the chemicals entering the environment; detergents amount to 1.5 million tons and organic pesticides to about 1 million tons. Environmental pollution can be due to those that do not occur in nature and for which degradative pathways may not exist. Lubricants and industrial oils add considerably to the danger. The possible fate of two major man-made organic chemicals, i.e., ethylene and chlorofluorocarbons, is considered.

19279 APTIC NO. 38551

Kern, H.

EXHAUST PERFORMANCE AND SILENCING OF AN INTERNAL COMBUSTION FOUR-STROKE HIGH-PERFORMANCE ENGINE. *(Leistung und Abgasschalldaemfung bei Viertakt-Ottomotoren hoher spezifischer Leistung). Text in German. Automobiltech. Z. (Stuttgart), 72(9):331--335, Sept. 1970. 10 refs.*

In addition to meeting noise-silencing requirements, an exhaust system for high-performance engines should have low resistance to flow. Collector-pipe exhaust systems, double-pipe systems, and pulse converters are discussed and evaluated. A sketch illustrating the effect of exhaust counter pressure on the overall gas exchange pressure distribution, on the valve lift, and on the piston speed during the gas exchange strokes of a four cylinder engine is given. Drawings on pressure distribution of a six cylinder four-stroke engine with collector-pipe, double-pipe, and pulse converter exhaust systems are included. Under normal conditions, the contribution of the exhaust system to the overall engine performance varies between 5.0 and 8.0%. Apparently, the application of a pulse converter could hardly achieve further improvements in terms of performance.

19280 APTIC NO. 38085

Khan, I. M., C. H. T. Wang, and B. E. Langridge

COAGULATION AND COMBUSTION OF SOOT PARTICLES IN DIESEL ENGINES. *Combustion Flame, 17(3):409-419, Dec. 1971. 10 refs.*

Coagulation and combustion of soot particles formed in a diesel engine were studied on two direct-injection diesel engines. Coagulation was studied by collecting samples of soot in the engine exhaust with a thermal precipitator and examining them by electron and optical microscopy. A coagulation constant which can be used to predict with a fair degree of accuracy the diameter of soot coagulates in the engine exhaustwas derived. Soot combustion was studied by generating soot in two cylinders of a four-cylinder engine and recycling it in another cylinder where the soot-containing exhaust gases were subjected to a temperature cycle by undergoing compression. A soot combustion constant was derived which can be used to predict the rate of soot combustion under known oxygen partial pressure. Results of the soot coagulation and combustion studies were applied for a diesel engine to calculate the importance of the combustion of soot during the expansion part of the cycle which follows the main burning period during the cycle. (Author abstract)

19281 *APTIC NO. 38327*

Klimovich, J. and J. L. McAndie

THE REVOLUTION IN THE AMERICAN PAPER INDUSTRY IN THE MATTER OF POLLUTION. (La revolution de l industrie papetiere americaine en matiere de pollution). Text in French. Patetiere, 93(11):1061-1066, Nov. 1971.

Since 1970, the pulp and paper industries have greatly increased their investments in anti-pollution measures, to comply with the latest regulations. For 1972, an estimated expenditure of around $180 million is predicted. This would be equivalent to an investment cost of about $3/ton of manufactured product. The cost of operating the purification equipment amounts to $1-2/ton produced. The major source of pollution in the past was the discharge of effluents into rivers. With the new methods, the effluents are first brought into settling reservoirs which are mostly of a circular shape. The settled sludge is removed by an internal mechanical wiping device, transported by pumping to a filter assembly, and moved into a sludge press. The squeezed-out sludge is then disposed of by incineration or dumping. The remaining liquid part of the effluent is subjected to a second stage treatment, which starts in a mixing tank where nitrogen and phosphorus are added as nutrients, and lime for pH adjustment. From there the liquid is transferred into a series of aerated basins where it is left for a period of several days; all biological activity is brought to an end, and the bacterial flora is consumed by the dissolved additives. The pulp manufacturing process involves several sources of air pollution, such as waste gases from the washer and the blow tank, non-condensable gas from the evaporator, and flue gases from the regeneration boiler. Some of the waste gases generated in these processes are accumulated and transferred to the lime kiln for joint combustion. The regeneration boiler represents the biggest source of air pollution, particularly due to the last stage of evaporation of the residual liquor by direct contact with the fumes, which causes a strong emission of sulfur. Modified technologies are applied in new installations, designed to suppress the fume and odor formation of the aforementioned last stage.

19282 APTIC NO. 38367

Knop, W.

AIR POLLUTION CAUSED BY THE FRYING OF FOOD. *(Luftverunreinigung beim Frittieren von Lebensmitteln). Text in German. Wasser Luft Betrieb, 15(12):440, Dec. 1971. 7 refs.*

Many fats used for frying food burn and develop blue vapors which rise from their surface as soon as the temperature of the hot liquid fat raises above 45 C. The color of this vapor is determined by the finest carbon particles which are liberated at the decomposition of the fat. The gaseous and vaporous decomposition of the fat. The gaseous and vaporous decomposition products have an annoying odor. Apart from water vapor and fat, they comprise odorous protein decomposition products and acrolein. The emitted odors are heavier than air and are primarily present in aerosol form. They remain for a long time near the emission source when cooled. In snack bars serving hot dogs and french fries, no cleaning units for the waste air are usually installed. The emitted aerosols settle on the walls of neighboring buildings and on plants and are a continuous source of annoyance.

19283 APTIC NO. 38283

Krueger, Wolfgang

BETTER CITY AIR BY GAS-CARS. *(Bessere Stadtluft durch Gas-Auto). Text in German. Umschau (Frankfurt), 72(6):184-187, March 1972. 1 ref.*

Experiments are presently being conducted with Otto engines for operating on natural gas which is composed of 95% methane. Methane contains a minimum of carbon and a maximum of hydrogen. The composition of the exhaust gas with natural gas operation was studied. The carbon dioxide concentration was almost constantly 6% and the carbon monoxide concentration reached a maximum of 0.1%, i.e., less than one twentieth of the gasoline-driven Otto engine. No addition of lead is required. Because of the complete combustion of the natural gas, the fuel demand is low. The constructional changes of the engine pose no problem, but the fuel storage does. The equivalent 40 l gasoline tank would be a 30 cu m gas container. If a thick-walled pressurized gas bottle is used with a peak pressure of 200 atm, the storage volume would still have to be 150 l. If liquid methane at minus 161.5 C is used, an insulated special tank of 50 l would be required. The great disadvantage of the high-pressure tanks is the danger of explosion in accidents. Nevertheless, test runs with commercial vehicles and buses are being conducted in the Federal Republic of Germany by MAN (Munich) and Daimler Benz (Stuttgart).

19284 APTIC NO. 38680

Laamanen, M.

EXHAUST GASES. *(Pakokaasut). Text in Finnish. Tyoterveysuutiset, 1969:9-10, Jan. 1969.*

Automotive exhaust gases may contain as many as 200 different substances. Most are harmless as they leave the exhaust pipe, but react chemically in the atmosphere to create new substances with numerous detrimental effects. These include toxic effects of carbon monoxide; corrosive effects of sulfur compounds; and the irritating effects of aldehydes and smoke. To reduce such hazards, higher quality fuel should be used or the exhaust gases should be cleaned. Even with such measures, it will probably still be necessary to limit traffic in congested areas and to switch to electrified mass transportation such as trolleys.

19285 APTIC NO. 38543

Lajthay, Jeno

ELIMINATION OF ENVIRONMENTAL POLLUTION CAUSED BY TRAFFIC. *(A kozlekedes kornyezeti artalmainak kikuszobolese). Text in Hungarian. Jarmuvek, Mezogazd, Gepek, 18(12):441-447, Dec. 1971. 10 refs.*

General characteristics of air pollution caused by internal combustion engines are outlined, and measures for the total elimination of pollution by traffic are described. In the exhaust gas, carbon monoxide accounts for 91%, unburnt hydrocarbons for 63%, nitrogen oxides for 48%, and sulfur oxides for 4% of the total volume of gaseous pollutants. Dust from exhaust amounts to 8% of the total volume. Modifications on engines give only partial decreases of pollution. A total ban on lead should be introduced. The use of natural gas instead of gasoline requires comprehensive research. Total elimination of air pollution caused by traffic could only be reached by vehicles powered by electric energy. Vehicles powered by accumulators, fuel cells, possibly by primary elements could be employed in different fields. The main emphasis should be on city traffic. Also, railroad transportation could profit from the electric drive. Compared to the operating costs of internal combustion engines per km, savings of 55%, 45%, and 20% could be reached with electrically powered small city cars, trucks, and fork-lifts, respectively.

19286 APTIC NO. 37925

Leibbrand, K.

TOMORROWS MEANS OF TRANSPORTATION. *(Die Verkehrsmittel von morgen). Text in German. Schweiz. Bauztg., 90(4):71-74, Jan. 1972.*

The future means of transportation shall produce no exhaust gases and no noise. Monorails and, magnetic or air-suspended trains driven by linear motors and maybe by atomic power are under consideration. Various new means of transportation operate without personnel. Their operation will be monitored and controlled by electronic computers. A closer look of the new systems either in the planning or developmental stage let them seem way off and not as appealing and flexible as the transportation in the individual car. Therefore means of faster transportation of individual cars on intersection free highways will be sought, and better bus transportation.

19287 APTIC NO. 38129

Liao, Paul B. and Michael J. Pilat

AIR POLLUTANT EMISSIONS FROM FLUIDIZED BED SEWAGE SLUDGE INCINERATORS. *Water Sewage Works, 119(2):68-74, Feb. 1972. 11 refs.*

Exhaust gas and particulate samples from fluidized-bed sewage sludge incinerators were analyzed for particle mass concentration and concentrations of sulfur dioxide, nitrogen oxides, carbon monoxide, carbon dioxide, oxygen nitrogen, and water vapor. The samples were collected before and after a scrubber and at various operating conditions and different sludge loadings. Uncontrolled gaseous pollutants were well below current emission standards: 2.79 lb SO_2, 0.022 lb CO, and 1.14 lb nitrogen oxides/ton of dry sewage sludge burned. Thus, controls for these pollutants are not required. In contrast, the uncontrolled particulate emission rate was 94.5 lb/ton dry sludge burned. Adequate removal was achieved with the scrubber. The amount of water vapor in the exhaust gases averaged 16.3%, which may be objectionable. The water vapor concentration was affected by sludge moisture content and by the amount the of fluidizing air; both SO_2 and water vapor emissions increased slightly with an increase in sludge loading rates.

19288 APTIC NO. 38595

Lunt, Owen R.

CONTROLLED-RELEASE FERTILIZERS: ACHIEVEMENTS AND POTENTIAL. *J. Agr. Food Chem., 19(5):797-800, Sept.-Oct. 1971. 30 refs. (Presented at the American Chemical Society, National Meeting, 160th, Chicago, Ill., Sept. 13-18.)*

Management advantages of controlled-release fertilizers are considered to be reduction in the frequency of application, reduction of injury hazard from large application, and greater utilization efficiency where leaching losses are normally high. Controlled availability fertilizers in use are, in addition to ureaformaldehyde, crotonylidene diurea, 1,1-diureido isobutane, metal ammonium phosphates, trace element glass frits, and coated soluble nitrogen sources. The basic approaches used to achieve controlled release are: limited solubility of compounds; use of nitrogenous compounds only slowly mineralized by microbial action; membrane-regulated diffusion from soluble sources; and use of materials based on cation or anion exchange resins. Because of their high cost, the controlled-release fertilizers are being used primarily in nonfarm markets, i.e., professionally maintained turf such as golf courses and parks. Concern over the introduction of nitrates into streams and lakes will require greater attention to efficient utilization of applied nitrogen. Recovery of fertilizer nitrogen by cultivated crops often represents only 1/3 to 1/2 of the applied. Leaching losses, denitrification, volatilization of ammonia and other processes remove the nitrogen controlled release fertilizers may reduce pollution. Surface coatings may also help.

19289 APTIC NO. 38011

Luzin, Yu. P. and V. V. Tsar Kov

REDUCTION OF ATMOSPHERIC DISCHARGES DURING THE ETCHING OF STEEL. *(Snizheniye vybrosov v atmosfery pri travlenii stali). Text in Russian. Metallurg, 16(12):32, Dec. 1972.*

Data are given on the release rate of sulfuric acid (in the form of fine droplets) and sulfur dioxide to the atmosphere from a plant etching cold-rolled steel sheet, with 9-20% H_2SO_4 at 85-100 deg, at a linear throughput (v) of 6-12 m/min. At v equals 10 m/min, 12.7 tons steel/hr were etched and produced 118,600 cu m/hr of exhaust gas containing 10.3 k/hr H_2SO_4 and 1.1 kg/hr SO_2. The H_2SO_4 in the Oexhaust can be reduced by allowing it to drop out in a long (less than 150 m) exhaust gas channel.

19290 APTIC NO. 38176

McNesby, J. R., R. Byerly, Jr., and Harold W. Woolley

CHEMICAL COMPOSITION OF POLLUTED AIR. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:56-58, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

A computer program for high-temperature reactions, e.g., those occurring in automobiles, was adapted to the examination of equilibrium properties of nitrogen and oxygen perturbed by the presence of carbon dioxide. Values of thermodynamic functions are read in for each constituent for 20 temperatures between 100-6000 K. Calculations were made for effects on nitric oxide equilibrium concentrations caused by varying conditions such as temperature, density, and CO_2 concentration. Introduction of CO_2 into the system had no effect on the NO equilibrium concentration at any of the temperatures or pressures specified.

19291 APTIC NO. 38186

McNesby, J. R., R. Byerly, Jr., and R. L. Raybold

EMISSIONS OF RUBBER FROM AUTO TIRES. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:72, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

Particulate matter was collected from tires run at up to 35 mph and 1000-pound loads around a paved indoor track. Preliminary analysis of samples showed no polynuclear aromatic hydrocarbons and also indicated that the material worn from the tires is probably a degraded material, i.e., not bits of virgin rubber.

19292 APTIC NO. 37947

Meier zu Koecker, Heinz and Wolfgang Klose

EVALUATION OF GASEOUS AND LIQUID FUELS WITH RESPECT TO THE SOOT FORMATION TENDENCY EXPECTED IN DIFFUSION FLAMES. *(Bewertung von gasfoermigen und fluessigen Brennstoffen in Hinblick auf ihre in Diffusionsflammen zu erwartende Russbildungsneigung). Text in German. Chem. Ing. Tech., 44(1+2):46-52, Jan. 1972. 22 refs. (Presented at the Verbrennung and Feuerungen of the VDI-Fachgruppe Energietechnik and the Deutschen Vereinigung fuer Verbrennungsforschung, Stuttgart, West Germany, Oct. 7-8, 1971.)*

A method for predicting the soot formation tendency of fuels at their combustion is discussed. The method is based on the hypothesis by Porter which essentially states that acetylene is formed as an intermediate product at the pyrolysis which polymerizes in the oxidation zone and thus provides the soot nuclei. The soot formation tendency of hydrocarbons is characterized by means of a technological factor. The usefulness of this factor is examined by means of experimental results. With the help of a thermodynamic parameter, the decomposition of hydrocarbons is characterized which permits ranking of hydrocarbons according to their soot formation tendency. The theoretical method has large error limits which can be reduced by further measurements. Only then will an exact determination of the conditions for reducing the soot content in waste gases be possible.

19293 APTIC NO. 38300

OGorman, J. V., N. H. Suhr, and P. L. Walker, Jr.

THE DETERMINATION OF MERCURY IN SOME AMERICAN COALS. *Appl. Spectry., 16(1):44-48, 1972. 17 refs.*

Mercury found in air and rainwater can result from the burning of coal. The mercury content of 10 coal samples of varying rank was analyzed by three methods: double gold amalgamation-flameless atomic absorption, neutron activation, and combustion-solution. The results obtained with the double gold amalgamation and neutron activation procedures were in reasonably good agreement; the combustion-solution technique gave somewhat lower values. The most marked discrepancies found with the third method occurred with high volatile samples of comparatively high mercury content. Of the three methods, double gold amalgamation with a spectrophotometer is the most rapid, the least expensive, and the least susceptible to mercury loss or to comtamination because of sample handling. The dispersion of mercury in the coals varied widely from sample to sample and also within a particular coal. The variation is due in part to the rather heterogenous natural of the coal substance. Therefore, extreme care is needed in sampling and in many instances utilizing a 200-mesh material will be an advantage.

19294 APTIC NO. 38604

Orlowski, A.

NOXIOUSNESS OF ATMOSPHERIC POLLUTANTS. I. - SULFUR DERIVATIVES. *(La nocivite des polluants atmospheriques. I - Les derives du soufre). Text in French. Tech. Moderne, no. 12:401-402, Nov. 1971. 1 ref.*

Sulfur dioxide disperses in air from domestic and industrial combustion or operations involving sulfur-loaded materials. It is oxidized to sulfur trioxide during some combustion and in engine exhausts, if discharged between 480 and 930 F. Contact of SO3 with water, in combustion or in fogs, produces highly toxic sulfuric acid. Sulfuric hydrate particles may occur in moisture saturated fogs. Common grades of fuel oil contain 0.4 to 4% sulfur. Lower content is obtainable by purifying the oil, but with the extra cost such as a 2% increase in the price of kw hrs with oil containing 1 to 2% sulfur. In the entire world, 90 million tons of SO2 and SO3 are discharged each year, amounting to 66 lbs/yr/head of a total population estimated at 3 billion people. With the present rate of increase of this pollution, life would begin to cease in 1980. For man, the odor is perceived at 3 parts per million in air. Toxicity begins at 10 ppm, eye irritation at 20 ppm, breathing difficulties at 60 ppm, and fatality at 100 ppm after 1/2 hr exposure. Acute intoxication brings serious swelling in lungs, while chronic exposure to 30 ppm or more will inflame the nose and pharynx. In the U. S. and Germany the maximum acceptable concentration of SO2 in air is 5 ppm. In the USSR, 4 ppm is permitted.

19295 APTIC NO. 38233

Padovani, Carlo and Piero Sturla

ATMOSPHERIC POLLUTION RESULTING FROM COMBUSTION IN LARGE THERMAL POWER PLANTS. *(L inquinamento atmosferico connesso alla combustione in grandi impianti termici). Text in Italian. Inquinamento, 13(7):23-29, Sept. 1971. (Presented at the International Congress on Clean Air, 2nd, San Francisco, Calif., Dec. 1970.)*

Sulfur dioxide emitted into the atmosphere by thermal power plants burning sulfur containing fuels has become the key problem for pollution control authorities, for the operators of the plants, and for their designers. The problem is not in the noxiousness of the emissions but in their volume, which is bound to increase. More appropriate maximal permissible emission standards at ground level should be established. Deeper understanding of the toxicity of SO2, and of the possible synergistic effects of other pollutants with SO2, along with the physical and chemical conditions favoring the oxidation of SO2 to sulfur trioxide is needed. The only currently available real control method is dispersion by high stacks. In emergencies, burning of low sulfur fuel oils, temporary limiting of operations, and the injection of neutralizing agents into furnaces can be ordered. Legal limitation of the sulfur content in fuels can increase the cost of energy by 40-60%; also, such fuels may not be available. Some of the numerous combustion gas desulfurization processes under development are interesting and should be developed by an international effort. Some other control systems are also interesting and potentially promising, such as fluid bed combustion or the oxygasification of fuels under pressure coupled with the exploitation of the dynamic energy of complex gases. Producers of energy should be obligated by law to use the best available technology to reduce pollution to a minimum and ground level maximal permissible standards should be enforced.

19296 APTIC NO. 38523

Partl, R.

WATER POWER IN INTERNATIONAL PERSPECTIVE. *(Die Wasserkraft in internationaler Sicht). Text in German. Oesterr. Wasserwirt., 23(11/12):228-236, Nov./Dec. 1971. 12 refs.*

With the increasing power demand and the rapid expansion of thermal power plants, the air pollution by these plants also rises. Thirty years ago in Los Angeles, 5 tons of sulfur dioxide were emitted every day into the atmosphere, 10 years ago the amount was 70 tons, and now it is 220 tons/day. Apart from the SO2 emissions, 2/3 of the primary energy are lost in form of waste heat in thermal power plants, through the stacks, or into rivers. In the future the waste heat of such plants must be re-used, e.g., in remote heating plants. This is feasible because both the power demand and the remote heat demand run parallel. Moreover, the pollution by individual heaters is cut out. (Air pollution is discussed on p. 234-235)

19297 APTIC NO. 38382

Rixmann, W.

DEVELOPMENT OF DRIVES WITH LOW POLLUTANT EMISSION FOR COMMERCIAL VEHICLES BY DAIMLER-BENZ. EXAMPLE NATURAL GAS - OTTO ENGINE AND DIESEL ENGINE. *(Entwicklungen an umweltgerechten Nutzfahrzeugantrieben bei Daimler-Benz. Bispiel Erdgas - Ottomotor und Dieselmotor). Text in German. Automobiltech. Z. (Stuttgart), 74(1):38-39, Jan. 1972. 1 ref.*

For a reduction of the combined emission of hydrocarbons and nitrogen oxides to 5 g/HPh and less by 1975, two methods can be used: the natural gas Otto engine, and the diesel engine with direct injection but with diminished power. For testing the operating characteristics of a natural gas-driven Otto engine, a new diesel engine was converted into a six cylinder Otto engine. The compaction ratio was reduced from 16 to 1, an ignition system was installed instead of an injection pump, and the injection nozzle was replaced by a spark. The mixture of natural gas/air was prepared in a mixer just ahead of the cylinder heads three and four Natural gas is carried along in pressurized bottles with a maximum of 200 kg force/sq cm; later the natural gas will be carried in liquid form in cryogenic tanks. At full load operation a fuel to air ratio of lambda equals 1.4 is maintained. The experiments with the natural gas Otto engine have been concluded and production may begin. The carbon monoxide emissions of this engine are far below the limit value of 25 g CO/HPh, the HC plus NOx emission are now 3.8 g/HPh. The heat consumption, however, rose by 15% over that of normal diesel engine operation. The second solution attempts to reduce the emissions by a modification of the diesel engine in a way which permits operation with a higher fuel/air ratio and a delayed injection. The power will go down to 172 hp, as this is the case also for the natural gas operated Otto engine.

19298 APTIC NO. 38330

Rossenbeck, Martin

FUEL CHANGES WITH A VIEW TO ENVIRONMENTAL PROTECTION. PART II. *(Kraftstoffwandel im Zeichen des Umweltschutzes). Text in German. Automobiltech. Z. (Stuttgart), 73(12):466-469, Dec. 1971. PART I.*

Ibid., 73(11):415-420, Nov. 1971. 37797 Roth, Helmut NEW DEVELOPMENT FOR REFUSE INCINERATION. (Neuentwicklung fuer die Muellverbrennung). Text in German. Energie Tech., 23(1):15-18, Jan. 1971.

Preliminary investigations and dimensioning problems concerning a refuse incineration plant are described. Flue gas temperatures at the end of the combustion chamber are given as a function of the excess air coefficient for various air temperatures. The hearth temperature is limited by a minimum flue gas temperature of about 800 C, required for the deodorization, and a maximum flue gas temperature of 1000-1100 C, depending on the softening point of the ashes. Depending on the cooling surface, relatively low flue gas temperatures can be applied in modern boilers with fully welded fin tubes, as the temperature is maintained below the maximum value even with low excess air coefficients. For steam generators combined with grate type refuse incineration, both low flue gas temperatures and flow speeds are required. The high degree of the combustion of the flue gases prior to entering the contact heating surfaces is provided by a sufficient hearth height. The flue gases should be cooled down below 750 C before reaching the heating surface. Corrosion hazards should be minimized by the special design of the heating surfaces. The furnace wall temperautre should be comprised between 130 C and 400 C.

19299 APTIC NO. 37954

Sandscheper, Guenter

ELECTRIC CARS APPEAR ON CITY STREETS. THE COORDINATED SEARCH FOR ELECTRIC VEHICLES FOR PASSENGERS AND FREIGHT HAS BEGUN. *(Elektroautos erscheinen im Stadtbild. Die koordinierte Suche nach elektrischen Fahrzeugen fuer Personen und Lasten hat begonnen). Text in German. VDI (Ver. Deut. Ingr.) Nachr. (Berlin), 25(49):1, 6, Dec. 1971.*

Japan has introduced three prototypes of electric cars by three different manufacturers. In the U. S. and Russia, electric cars are on trial runs. The Fiat company indicated that it will have an electric car in four to five years. In the Federal Republic of Germany, the traffic law of 1955 included the battery of an electric car in the vehicle weight which is to be taxed. In addition, a special driving examination for the operation of electric cars is required. This law stifled all interest in the electric car. The recent debates about exhaust gas pollution renewed this interest, however. On April 5, 1971, the first prototype of an electric car was introduced which has a weight of 1120 kg (210 kg to the drive; 870 kg to the battery). The useful load lies between 750 and 1000 kg. The entire chassis of the car is made of glass fiber reinforced synthetic material the hollow space of which is filled with polyurethane foam. It is driven by a thyristor-controlled separately-excited direct current electric machine. The power of the engine reaches 44 kW in short-term operation and 22 kW in long-term operation. The battery produces a voltage of 144 V. The car can achieve a maximum speed of 80 km/hr. Distances of 60 to 100 km can be spanned. Plans are proposed to increase the number of different types of electric cars to ten or twenty. In a second step, beginning in 1974, more experience shall be gathered with approximately 200 vehicles. If necessary, further experience shall be gathered on the basis of 2000 electric cars. Financial aid from the federal government will be necessary in order to realize the program.

19300 APTIC NO. 38234

Sanz, Sigismondo and Gregorio Milan

COMBUSTION OF COMBUSTIBLE LIQUIDS. *(La combustione di combustibili liquidi). Text in Italian. Lo Smog (Italy), 1971: 17-31, 1971. 35 refs.*

The current theoretical and practical knowledge about the combustion of drops of combustible liquids, especially of hydrocarbon fuels, in internal combustion engines is reviewed; results obtained with the experimental combustion of fuel drops are evaluated; and the possibilites of extending the application of the results achieved to jet combustion are considered. Calculated and experimentally achieved combustion velocities were in agreement within the limits of the variation of the drop radius. The evaporation velocity of the fuel at 3000 K remained substantially unchanged whatever the pressure in the cylinder (of the reciprocating engine). The pressure in the cylinder at a constant temperature has only a small influence on combustion velocity: an increase in pressure from one to 60 atm causes only a 10% increase in the combustion velocity of the fuel drop. The flame temperature and the combustion constant at a given pressure increase approximately linearly with the temperature prevailing in the cylinder. Fuel drops at the injection terminal require a certain time for complete combustion. This amounts to a 30 degree rotation of the crankshaft for normal diesel fuel. Injected fuel drops require time for evaporation and for the attainment of a minimal concentration required for ignition, which explains the ignition lag and the necessary injection advance. The effect of convection on fuel combustion is negligible. Also the effects of the interaction between adjoining drops are negligible. The validity of results obtained can probably be extended also to jet combustion under industrial conditions.

19301 APTIC NO. 38625

Sawyer, Robert F.

ATMOSPHERIC POLLUTION BY AIRCRAFT ENGINES AND FUELS -- A SURVEY. *California Univ., Berkeley, Dept. of Mechanical Engineering, Advisory Group for Aerospace Research and Development Rept. AGARD-AR-40, 38p., March 1972. 109 refs.*

The problem areas of aircraft air pollution, grouped under the main categories of engines, fuels and lubricants, aircraft operations, airports, atmospheric interactions, and control and enforcement, were surveyed, and research within the areas was reviewed. Air pollutants from aircraft include carbon monoxide, nitrogen oxides, hydrocarbons, sulfur oxides, aldehydes, carbon dioxide, smoke, particulates, lead, metals, odorous sulfur compounds, halogen compounds, and odorants. Specific areas of studies within the main categories are engine emission characteristics, test procedures, visible smoke reduction, nitric oxide formation, CO and hydrocarbons at low power, particulate emissions, exhaust odor and aldehydes, effect of reheat, combustor modeling, piston engines, auxiliary power units, effect of fuel composition and properties, lubricant contribution, fuel damping, ground operations, flight operations, aircraft control, air quality within aircraft, at and near airports, and in terminal buildings, V/STOL facilities, airport siting, effects of low and high altitude emissions and air basin impact, establishment of emission standards, enforcement procedures, cost-effectiveness and trade-off, and international controls.

19302 APTIC NO. 38654

Schabad, L. M. and G. A. Smirnov

THE ROLE OF AVIATION AT THE POLLUTION OF THE HUMAN ENVIRONMENT WITH CARCINOGENIC HYDROCARBONS (STUDIES OF THE BENZO-3,4-PYRENE). *(Die Rolle der Luftfahrt bei der Verunreinigung der menschlichen Umgebung mit kanzerogenen Kohlenwasserstoffen (Untersuchung des 3,4-Benzpyrens). Text in German. Z. Ges. Hyg. Ihre Grenzgebiete (Berlin), 17(12):888-891, Dec. 1971. 8 refs.*

The soot and exhaust gas of several airplane models was analyzed by means of the fluorescence method. In all soot samples, benzo-3,4-pyrene was found in quantities of 250 micrograms to 30 mg/kg soot. By means of the gas volume, which is drawn through the absorption vessel, and its benzopyrene content, the total emission of benzopyrene was determined. The jet and turboprop engines emitted 2 to 4 mg benzopyrene/min. In addition to these measurements the carcinogenic effect of the soot was studied in animal experiments. An extract was prepared from the soot samples which contained 0.1% benzo-3,4-pyrene. The extract was applied to the skin of mice. In all cases malignant tumors could be produced. Metastases developed in six out of 52 animals. Finally the pollution of the vegetation in the immediate vicinity of the Moscow airport was examined. In direction perpendicular to the landing strip, the benzo-3,4-pyrene concentration decreased from 64.3 to 15.5 micrograms/kg soil, which clearly identifies the source of the pollution. In the vicinity of the taxiways, the concentration was 67.2 micrograms/kg soil. The addition of magnesia to the fuel reduced the benzopyrene emission by 31.5%, the use of fuel stripped of all aromatics reduced the benzopyrene emission by 58.5%.

19303 APTIC NO. 37793

Schneider, F. A.

ALTERNATIVE POWER SOURCES FOR MOTORCARS. *(Alternatieve krachtbronnen voor automobielen). Text in Dutch. Polytech. Tijdschr., Ed. Wertuigbouw., 26(26):1102-1110, 1971. 9 refs. (Presented at the Technisch Economisch Genootschap, Utrecht, Netherlands, Sept. 15, 1971.)*

Efforts to achieve cleaner combustion in automobile engines are reviewed. A hybrid drive developed by Daimler-Benz, Bosch and Varta, a diesel oil fuelled Stirling engine with helium charging, gas turbines, and electric hybrid dirves based on galvanic cells are considered. Hydrazine-air batteries and zinc-air batteries with lead accumulators are included.

19304 APTIC NO. 38331

Schwanecke, R.

WAYS TO A LEAD-FREE GASOLINE. *(Wege zum Bleifreien Benzin). Text in German. Wasser Luft Betrieb, 15(12):442-445, Dec. 1971. 3 refs.*

At present three possibilities exist for production of a lead-free gasoline with about 92 to 102 RON (research-octane-number), namely reforming, isomerization, and alkylation. In catalytic reforming the initial material for powerforming is naphtha from the mineral oil distillation. Naphtha is first desulfurized, heated, compressed, and passed over the catalytic beds of the three reactors. There the naphthenes are converted to aromatics at temperatures between 450 and 500 C and at pressures of 10 to 30 atm. The investment costs for a reforming plant with an output of 1 million tons/yr amount to about 6 million dollars, including the catalyst but without desulfurization and stabilization. For the isomerization process, a mixture of pentane/hexane from the crude oil distillation is heated with hydrogen to between 350 and 450 C and compressed to 20 to 40 atm and desulfurized. After stabilization, hydrogen is added again and the aromatics present in the mixture are converted to paraffins at 330 C and 60 atm. For better activation of the catalyst, a small quantity of hydrogen chloride is added; finally the mixture is converted at 160 C and 18 to 25 atm to an isomeric mixture consisting primarily of methylpentanes and methylbutanes. For alkylation of paraffins or naphthenes, the isobutane is brought to reaction with suitable olefins at 20 to 25 C in presence of hydrogen fluoride as a catalyst. In a fractionating column the light hydrocarbons (propane, Hydrogen fluoride) are driven off and the paraffin/alkylate mixture is stabilized. The German Federal Republic would have to invest $190 million for construction of reforming, isomerization, and alkylation plants, should the gasoline become lead-free. The price of the gasoline would go up 1-2 cents/l fuel.

19305 APTIC NO. 38652

Schwarz, Kurt and Wolfgang Bernhauer

POWER PRODUCTION AND ENVIRONMENTAL PROTECTION. *(Elektrizitaetserzeugung und Umweltschutz). Text in German. Energie Tech., 24(1):1-3, Jan. 1972.*

Power production is based primarily on combustion processes. They affect the atmosphere in two ways: they interfere with the earth s carbon cycle, and they pollute the atmosphere by waste gases and particulate matter. Over the last century, the carbon dioxide concentration of the atmosphere rose through the increasing combustion of fossil fuel. A further rapid increase of the CO2 concentration in the atmosphere might have repercussions on the climate. Secondly, power plants emit visible particulate matter and gases. The collection of particulate matter has been successfully solved. Collection efficiencies of 90 or 99.9% are solely a matter of cost. No satisfactory solution for the desulfurization of waste gases has been found. Several methods are under development. It is estimated that additional costs of 0.1 cents/kWh will arise. At the moment a better dispersion of the SO2 is sought by the construction of high stacks. The quantity of pollutants emitted by power plants is surprisingly low. The largest amount comes from automobiles. Through a series of legal measures the government of the Federal Republic of Germany will attempt to protect the atmosphere.

19306 APTIC NO. 38671

Schwarzbach, E.

OZONE AND NITROGEN OXIDE FORMATION DURING WELDING. *(Ueber die Entstehung von Ozon und Stickoxyd beim Schweissen). Text in German. Zentr. Arbeitsmed. Arbeitsschutz, 21(9):290-292, 1971.*

Ozone concentrations at 70 welding locations ranged from 0.03-100 ppm and were roughly proportional to arc temperature. The plasma process gave the highest values and the light arc process with coated electrodes the lowest values. Nitrogen oxides concentrations were 0.5-20 ppm, the electrode process producing the highest values. The upper end of each range is above the maximum permissible concentration.

19307 APTIC NO. 38073

Smith, O. F.

WHAT IS ECOLOGY? Heating, Piping, Air Conditioning, 44(2):58-61, Feb. 1972.

The pollution problem is the strain on the capacity of the ecosystem to absorb the residuals of materials and energy that man dumps into it. The contribution of industry to the problem is largest in the water environment. Industrial waste waters impose 75% of the biological oxygen demand on natural waters in the U. S. In the air environment, industrial sources account for a lesser proportion of problems. Including electric utilities, industry contributes 31% of the total of all pollutants. This, however, includes 80% of the sulfur oxides and 75% of the particulates. Only in carbon monoxide emissions is the industrial share insignificant, and personal automobiles more than make up the lack. If pollution is to be manageable, industry must execute its planning and designs in terms of their ecological functions and the effects they will have on the ecosystem.

19308 APTIC NO. 38636

Sutterfield, F. D., G. P. Sturm, Jr., and B. Dimitriades

REACTIVITIES OF AUTOMOTIVE EMISSIONS FROM FUELS OF VARIED FRONT- END COMPOSITION. *Bureau of Mines, Bartlesville, Okla., Bartlesville Petroleum Research Center, RI-7539, 13p., July 1971. 10 refs.*

NTIS: PB 201894

A study was conducted to provide experimental evidence on the effect of modifications of gasoline front-end compositions on the photochemical specific reactivities of automotive emissions. Evaporative and evaporative-plus-exhaust emissions from an automobile operated with four fuels of different volatility and varying levels of carbon 4-carbon 5 olefins were irradiated in a 100-cu ft environmental chamber at three sets of initial hydrocarbon-nitrogen oxides concentrations. Reactivity was measured and expressed in terms of rate-of-nitrogen dioxide formation and dosages of oxidant, peroxyacetyl nitrate, and formaldehyde. The compositional changes that were necessary in reducing fuel volatility were found to have no significant effect on the reactivity of the emissions. However, replacing C4-C5 olefins with saturated components resulted in sharp decreases in all reactivity manifestations observed for the evaporative emission samples. A lesser influence of C4-C5 olefin replacement found with the composite exhaust-plus-evaporative samples; the effect that was observed could be attributed to the evaporative emission portion of the sample. (Author abstract modified)

19309 APTIC NO. 38653

Teshirogi, Naohisa, Sadaichi Ozaki, and Yoshitada Uchiyama

EFFECTS OF ATMOSPHERIC CONDITIONS ON AUTOMOBILE EMISSIONS. *J. Mech. Lab. Jap., 16(2):91-112, 1970. 13 refs.*

The relation between prevailing atmospheric conditions and exhaust emissions was investigated using a 4-stroke cycle gasoline engine to determine the effects of temperature, pressure, and humidity on exhaust gas composition of carbon monoxide and hydrocarbons. Atmospheric temperature variation affected the formation of air-fuel ratio during the air intake process; even when the ratio was adjusted to optimum value, it increased with temperature increase, thus rapidly increasing CO and HC concentrations. Concentrations of CO and HC increased with a decrease in atmospheric pressure. The HC concentration variation rate was larger in relation to atmospheric pressure variations than to temperature variations. As pressure decreased, air-fuel ratio increased, simultaneously lowering exhaust pressure. An increase in humidity did not cause air-fuel ratio to vary largely. Testing conditions and results at various engine cycles are included as well as formulae defining the relationships. (Author summary modified)

19310 APTIC NO. 38526

Thoenes, Hans Willi and Wolfgang Guse

CARBON MONOXIDE EMISSION IN INDUSTRIAL AREAS. *(Kohlenmonoxid-Emissionen aus Industriebetrieben). Text in German. Staub, Reinhaltung Luft, 32(2):50-52, Feb. 1972. 3 refs.*

The carbon monoxide emission by steam boilers, cupola furnaces, the chemical and petrochemical industry, and coking plants is discussed. The Federal Republic of Germany has 1800 cupola furnaces which emit considerable amounts of CO. For instance, as continuous and discontinuous measurements showed, a cupola furnace with a nominal capacity of 15 tons/hr produces 20,000 cu m waste gas/hr of which 4% by vol (982 kg/hr) are CO. An observation of the firing process revealed that the CO concentration decreased drastically whenever overhead firing occurred during charging. In the chemical industry CO emissions occur when the gas pipes are leaky or at cleaning or scrubbing processes of the organic products for which CO was used, e.g., methanol or formaldehyde. According to U. S. statistics, 50 g CO are emitted/kg formaldehyde produced. In coking plants CO is emitted during the charging of the furnace. Measurements revealed that concentrations of more than 5.4% by vol are not emitted longer than 1 min.

19311 APTIC NO. 38374

Weh, H., F. Ermisch, and A. Lang

STUDIES CONCERNING FUEL CELL SYSTEMS AND THE ECONOMIC CITY AUTOMOBILE. *(Untersuchungen zu Brennstoffzellen-Systemen und zum wirtschaftlichen Stadtautomobil). Text in German. Motortech. Z. (Stuttgart), 33(1):1-3, Jan. 1972.*

For the development of electric cars for city traffic, only the conventional lead battery is available at the moment. Fuel cell batteries are still too expensive and weigh too much. The distance which can be covered with a lead battery is at present 40 to 70 km. Larger distances can be spanned through the use of charging aggregates fro which waste gas/low combustion engines can be used, e.g., a diesel generator. The additional investment costs for the diesel generator can be compensated by more economic operation of the battery. The hybrid system has already been tried out on city buses.

19312 APTIC NO. 38542

Winthrop, S. O.

AIR POLLUTION IN THE URBAN ENVIRONMENT. *Occupational Health Rev. (Ottawa), 22(1/2):26-35, 1971. (Presented at the Symposium on Solutions for Pollution in the Urban Environment, Montreal, Quebec, Nov. 30, 1970.)*

The problem of air pollution in the urban environment, with regard to sources, effects on the total ecological systems, and possible control methods, is reviewed. Air pollution is one of the most difficult and sensitive problems today and is intimately related with meteorology, weather, and atmospheric chemistry. The greatest source of air pollutants is the combustion of fossil fuels. Other important sources include iron and steel manufacturing, metal smelting, oil refining, pulp and paper manufacturing, and chemical and petrochemical operations. The major pollutants include suspended particulates, sulfur dioxide, carbon monoxide, nitrogen oxides, hydrocarbons, and oxidants. There are two main categories of air pollution effects on human health: discomfort and annoyance and actual physical injury. Air pollution is a contributing factor to the rising incidence of chronic respiratory diseases including lung cancer, emphysema, bronchitis, and asthma. Visibility deterioration, materials damage, and destruction to vegetation are also prevalent. Research into the epidemiology of pollution-effected diseases and toward the development of new control technology is a clear necessity. Costs of air pollution damage are high.

19313 APTIC NO. 38549

Zuendorf, Uwe

AIR POLLUTION INCREASES. THE ATMOSPHERE CANNOT TAKE MUCH MORE TO REACH THE HARMFUL LEVEL. *(Luftverunreinigung nimmt zu. Die Belastbarkeit der Atmosphaere bis zur Schaedigungsschwelle ist gering). Text in German. VDI (Ver. Deut. Ingr.) Nachr. (Berlin), 25(52)13, Dec. 1971.*

North Rhine Westphalia is often praised as the state with the most progressive emission protection law. Its air pollution monitoring system is frequently called the World s most modern, and yet a steady deterioration of the air quality can be observed. Within the next 10 yrs the sulfur dioxide emissions will rise by 44%. Annually 30 million tons of air pollutants are thrown into the atmosphere in all of West Germany. The highest amount goes to carbon monoxide with 15 million tons annually, it is followed by sulfur dioxide with 5 million tons, by hydrocarbons with 4.8 million tons, by aerosols with 4 million tons, and by the oxides of nitrogen with 2 million tons. From this total emission quantity an average annual emission of 120 tons/sq km is obtained. For industrial centers, this amount is 20 times as high. The effect of air pollutants on organisms and materials have yet to be determined even for the smallest emissions. The present limit values are not adequate. Very little is known about the synergistic effect of air pollutants. More intense protective measures on a collective basis are required.

CONTROL METHODS

19314 APTIC NO. 37773

INCINERATION PLANT FOR PLASTIC AND RUBBER WASTES. *(Verbrennungsanlage fuer Kunstoff- und Gummiabfaelle). Text in German. Kunstoffe, no. 2:62, Feb. 1972.*

A cyclone furnace was developed for the incineration of rubber and plastic wastes. The compact rotary furnace works at temperatures between 800 and 1000 C and burns the waste material within 3-10 sec. The cyclone prevents the formation of smoke and bad odors. Flue gases are thus extremely pure. The cyclone furnace can process 400 tires/hr and can be heated by fuel oil or gas if necessary.

19315 APTIC NO. 37826

SULFUR CODES POSE DILEMMA FOR COAL. *Environ. Sci. Technol., 4(12):1104-1106, Dec. 1970.*

The demand for naturally occurring low-sulfur coal is already severely stressing the supply and sparking an increased emphasis on coal desulfurization technology. Just how much can be accomplished by present coal desulfurization technology is largely limited by the natural distribution of sulfur within coal, where it exists in two forms. Organically bound sulfur arises from the original sulfur content of the vegetable matter from which the coal seam was formed, and is evenly distributed throughout the coal deposit. Inorganic sulfur, in the form of pyrite, is that which has leached into the coal seam after it has formed, and is deposited in discrete lumps through the coal deposit. Pyrites usulaly represent 40-60% of a given coal s sulfur content, and are the only form of sulfur accessible to practical coal desulfurization techniques. Most modern coal preparation plants include steps taken to upgrade coal in terms of Btu content. There are several coal washing techniques in use or being developed for application to desulfurization. Other separation methods based on specific gravity that are being investigated include the hydrocyclone. Several other methods for pyrite removal have been suggested -- e.g., the use of dielectric heating to convert the nonmagnetic pyrite into the ferromagnetic pyrite which then could be removed magnetically, and froth flotation. Costs are mentioned as well as programs and efforts to bring pyrite removal technology into further utilization.

19316 APTIC NO. 37932

EXHAUST GAS DILUTER. *(Abgasverduenner). Text in German. Wasser Luft Betrieb, 16(1):30, Jan. 1972.*

The exhaust diluter deflects the exhaust gas, which enters under pressure, on an annular slot and draws in large quantities of air with high speed. Measurements on a diesel engine showed that only 200 ppm of carbon monoxide remained in the exhaust gas at idling and none at full-load operation. The investment costs are low and no maintenance is required. The exhaust diluter has proved its efficiency in highway tunnels and railroad tunnels.

19317 APTIC NO. 37937

THE CONTRIBUTION OF GAS HEATING TO THE MAINTENANCE OF CLEAN AIR. *(Beitrag der Gasheizung zur Luftreinhaltung). Text in German. Gas Wasserfach Gas Erdgas (Munich), 112(12):616, Dec. 1971.*

At the end of 1970 about 1.5 million households were heated by gas. Over 1969 this is an increase by about 200,000 households. Almost one quarter of the seven million German households were thus heated by gas. The demand for gas by household rose almost 32% over 1969 to 5.1 billion cu m (4300 kcal/cu m). Thus emissions from conventional domestic heaters went down.

19318 APTIC NO. 38003

THE VENTURI SCRUBBER. *(Der Venturiwaescher). Text in German. Technica, 20(26):2596, Dec. 1971.*

The venturi scrubber is cylindrically shaped. The separation process takes place in several steps. The first step is formed by a wet cyclone action where the dust-laden gases enter tangentially into the scrubber and pass a zone of water mist. Due to the wetting and the centrifugal force, a large portion of the dust is separated at this stage. The partially cleaned gas flow then passes the venturi nozzle. The gas mixture is accelerated in the venturi pipes. At the narrowest point, water is injected through an annular slot. An intense mixing between water and gas is achieved. The two media are separated again in a centrifugal water separator. The water is recirculated. Only the amount of water that evaporates or is carried off with the sludge must be replaced. Experience has shown that the water level drops by about 30 mm/hr due to evaporation.

19319 APTIC NO. 38029

CELL SYSTEMS KEEP MERCURY FROM ATMOSPHERE. *Chem. Eng. News, 50(7):14-15, Feb. 14, 1972.*

Most mercury cells for the electrolytic production of chlorine are now fitted with suction ducts to draw off and to box venting air streams in addition to the hydrogen coproduced with chlorine and sodium hydroxide. In a new control technique, the mercury-laden vent gases and hydrogen are washed with a solution of sodium hypochlorite and sodium chloride at a pH between 9 and 10.5. The chloride ions keep the mercury in solution as a complex salt. The mercury can then be recovered by blending the scrubbing solution with a brine that enters the amalgam cells, or by electrolytic or chemical reduction. The method is capable of reducing ther mercury level of the scrubbed hydrogen to 6 mg/metric ton of chlorine. Also described are two improved systems for removing mercury from liquid effluents. Both involve reduction of mercury compounds with simultaneous vaporization of the mercury and its recovery.

19320 APTIC NO. 38213

ACADEMY OF SCIENCES WEIGHS PROBLEMS OF MEETING 75-76 EMISSION REQUIREMENTS. *Automotive Eng., 80(3):30-35, March 1972.*

According to the National Academy of Sciences, internal combustion engine technology will be pushed to the limit if 1975 and 1976 auto and light-duty vehicles are to meet emission specifications, and compliance will be quite difficult and costly. Compared to 1973 vehicles, NAS estimates that 1975 vehicles will have to cost about $200 more because of emission devices, as well as being 3-12% more costly in fuel consumption. Briefly, the standards promulgated for 1975 vehicles are: 0.41 g/vehicle mi for hydrocarbons, 3.4 g/vehicle mi for carbon monoxide, and 3.0 g/vehicle mi for oxides of nitrogen. Nitrogen oxides have to be cut to 0.4 g/vehicle mi for 1976 model year vehicles. The testing procedure prescribed by the Environmental Protection Agency is described. Most of the promising emission control systems for 1975 will require improved carburetor performance, a fast-acting and more accurate choke, an inductive or electronic ignition system with modified timing, an exhaust gas recycle, a secondary air pump with injection into exhaust port or manifolds, and an oxidizing catalytic converter. Deterioration in catalyst effectiveness is the greatest problem with present emission control system designs. Durability testing, how controls affect performance, maintenance, and manufacturing problems are considered.

19321 APTIC NO. 38236

BUILDING DESIGNERS JOIN WAR ON THE AIR POLLUTION. *Eng. News- Record, 187(8):21, 23, 25-26, Aug. 19, 1971.*

Federal air quality standards may accelerate the development of by product recovery processes by thermal power plants and the upgrading of municipal and apartment house incinerators. In one recovery process under development, a catalyst converts sulfur dioxide to sulfur trioxide, which then condenses to sulfuric acid. The process requires stack gas at 800-900 F, thoroughly cleaned of particulates. In another kind of recycling experiment, a power plant will use municipal refuse to fire a 125-mw burner. Where apartment incinerators are banned, refuse compactors facilitate the collection and transport of refuse by increasing refuse density to three to five times the normal density. Particulate emissions from municipal incinerators are controlled by electrostatic precipitators, baghouses, and scrubbers. Control techniques open to building designers include the use of (1) central heating or air-conditioning plants; (2) better thermal insulation to reduce building heat and stabilize energy consumption; and (3) shade trees, louvers, canopies, and other natural and architectural features to reduce summer heat gains. Central heating and air conditioning plants for large consolidated projects offer great opportunities for reducing air pollution; pollution control through reduced energy consumption can reduce operating costs of a building.

19322 APTIC NO. 38251

DEVICE FOR COMBATING DUST AND NOISE. *(Staub- und Laermbekaempfungseinrichtung). Text in German. Neue Bergbautech., 1(12):950-951, Dec. 1971.*

Wagons used in mines must regularly be cleaned from the incrustations on the bottom. To date the dirt could only be removed manually be so-called howing machines. The dust and noise development during this work was almost unbearable for the entire neighborhood. All effects to clean the wagons by other means were unsuccessful. Finally vibrators in connection with a protective hood were installed. The dust developing during the cleaning process is now drawn off entirely by a suction tube of 300 mm diameter. With the new cleaning mechanism, 30 wagons can now be cleaned/hr.

19323 APTIC NO. 38261

EQUIPMENT FOR WET CLEANING OF WASTE GASES FROM COMBUSTION ENGINES. *(Einrichtung zum nassen Reinigen der Abgase von Brennkraftmaschinen). Text in German. Wasser, Luft Betrieb, 16(3):100, March 1972.*

Popular devices for wet-cleaning waste gases from combustion engines pass the gases over wet surfaces. Pumps or pressurized pipes are required for maintaining a wet surface, which create a higher space demand and thus raise the costs of the equipment. To avoid this disadvantage, the exhaust gas is passed through ducts with variable cross sections. This permits regulation of the gas pressure. The ducts are connected with the chambers containing the cleaning fluid by connection ducts. The cleaning fluid flows in quantities that are regulated by the gas pressure through the connection ducts into the cleaning chambers which are equipped with filters. The cleaning fluid is divided into a number of individual flows and atomized in the cleaning chamber.

19324 APTIC NO. 38262

IMPROVED ROLLERBAND AIR FILTER. *(Verbessertes Rollband-Luftfilter) Text in German. Wasser, Luft Betrieb, 16(3):97, March 1972.*

A new version of the rollerband air filter has been devised, equipped with a so-called metronome control which transports the air filter in predetermined intervals. The discontinuous transport of the band is adjustable according to existing dust quantities. The filter transporting mechanism is equipped with a printed circuit. The upper filter band roll is protected against dust by a plastic cover which automatically adjusts to each roll diameter.

19325 APTIC NO. 38263

ELECTROSTATIC DUST PRECIPITATOR. *(Elektrischer Staubabscheider). Text in German. Wasser, Luft Betrieb, 16(1):25, Jan. 1972.*

Long discharge and formation of glow discharge at ionizing electrodes in electrostatic dust precipitators can be avoided by supplementing the ionizing electrode with a non-emitting section. This non-emitting section provides additional capacity with the opposite collection electrode. Due to the higher total capacity of the ionizing electrode, a high discharge current develops at any discharge so that the voltage drop across the discharge path is very high and the duration of the discharge is quite short.

19326 APTIC NO. 38265

WASTE GAS STACK OF SPIRAL TUBES. *(Abgaskamin aus Spiralrohren). Text in German. Wasser, Luft Betrieb, 16(3):98, March 1972.*

A 90 m high stack was erected, made of synthetic spiral tubes, to discharge flue gas from a chemical plant in Antwerpe. A concrete jacket is used as carrier structure. The spiral tubes of rigid polyvinylchloride are resistant to the sulfuric acid and sulfur dioxide containing waste gas which has a temperature of 60 C upon passage through the stack.

19327 APTIC NO. 38306

OIL BURNER GIVES REDUCED POLLUTION AND BETTER ECONOMY. *Design Eng. (Canada), 17(4):40-41, April 1971.*

A highly efficient low-pollution industrial oil burner was developed jointly by Gulf Oil Canada and the Ontario Research Foundation as a result of a seven-year $500,000 research project funded by the oil company. Described as Vortometric, the burner creates a whirling vortex of fuel and air to achieve essentially complete and smokeless combustion of even the heaviest petroleum fuels under low excess air conditions. Its name is coined from the words vortex and stoichiometric, the latter meaning combustion with a minimum of excess air (and oxygen) to retard formation of the more objectionable oxides of sulfur and nitrogen. Formation of particulates is also greatly reduced, but sulfur dioxide continues to be mainly a factor of the amount of sulfur in the fuel. However, the Gulf burner can be switched to any combination of liquid fuel and natural gas that may be desirable during adverse weather conditions. The burner also offers fuel savings of about 5%, an extremely wide range of efficient operation, and significantly reduced operating, control, and maintenance costs. There are three main parts to the Vortometric burner -- an air volute, fuel atomizer, and combustor. Operating details are mentioned.

19328 APTIC NO. 38318

DOMESTIC HEATING PLANTS AND AIR POLLUTION. *(Gli impianti di riscaldamento e l inquinamento atmosferico). Text in Italian. Lo Smog (Italy), 1971:32-34, 1971.*

In Milan and Turin the monthly precipitation of particulates/sq km amounts to from 6 to 17 tons. Even though smog conditions have not yet materialized, this high level of emissions has a detrimental health effect, especially in winter months. The uncontrolled situation of emissions from domestic heating plants can lead to a further aggravation of the situation. Boilers for central heating plants exist which work with a heat conversion exceeding 85% and which emit a comparatively small amount of pollutants. High boiler efficiency is dependent on an even quality of fuel, a condition which in most circumstances can be met; certainly it can be met with coke and with anthracites containing low levels of sulfur and volatile substances. The cost of modern heating plants for domestic heating is ultimately lower than the aggregate cost of purification equipment and the higher maintenance cost that would have to be decreed by the authorities for outmoded installations. Modern central heating plants are equipped with thermostats, automatic equipment for the removal of ashes and slag, automatic draught regulations, and hot water dispensers for domestic use.

19329 APTIC NO. 38333

HOT GAS DUST COLLECTION BY TUBULAR CLOTH FILTERS. *(Heissgas-Entstaubung mit Schlauchfiltern). Text in German. Wasser Luft Betrieb, 15(12):460-461, Dec. 1971.*

The steel plant in Hamburg is the first plant in Europe which uses electric current and natural gas. Only in the arc furnace do dust-containing waste gases develop, which must be cleaned prior to discharge into the atmosphere. One of the two furnaces which the plant possesses has been equipped with a dry dust collection system. It consists of tubular cloth filters preceded by a gas cooler. The system has a capacity of cleaning 60,000 cu m gas/hr and operates fully automatically, especially in rapping and cleaning the filter bags. The gas enters the cooler with an average temperature of 400 C and leaves it with temperatures between 100 and 130 C. The two filters comprise 20 bags each which are made of polyester. The cleaned gas leaves through 37 m high stack. If the gas temperature at the cooler exit rises above the usual temperature, fresh air is added via a bypass system until the required temperature is reached. The bags are connected to a vibrating frame. Through electric motors they are set into high-frequency vibration, simultaneously the cleaned gas is pressed through the bags according to the reverse air jet cleaning principle. Cleaning of a filter cell takes 10 sec. Three of the 24 cells are cleaned at a time. The results with the system have been good. It has operated since July 1971 without any problems.

19330 APTIC NO. 38373

STACKS OF WEATHER-PROOF STEEL. *(Kamine aus wetterfestem Stahl). Text in German. Stahl Eisen (Duesseldorf), 92(4):1841, Feb. 17, 1972.*

A power plant with four units, each with a net capacity of 400 MW, is erecting weather-proof steel stacks for waste gas removal. It is hoped that these stacks are entirely free of maintenance, since no protective coating is required. A layer of almost insoluble complex compounds develops on the weather proof steel surface under atmospheric conditions. This layer protects the surface of the metallic iron against water and oxygen. The sulfur dioxide which causes the corrosion of ordinary steel is incorporated into the protective layer. The layer is of dark-brown to dark-purple color of uniform grained structure which is comparable to the patina of copper. Each of the four stacks will have a height of 120 m.

19331 APTIC NO. 38377

THE RUHRKOHLE DUST COLLECTOR. *(Der Ruhrkohle-Entstauber). Text in German. Zucker, 25(1):25, Jan. 1972.*

A new dust collector has been developed for cleaning boiler waste gases. The new filter has a high collection efficiency and a low flow resistance. The uncleaned gas enters the filter tangentially. The individual cyclones are arranged in a stepwise manner, thus exposing the entrances for ready acceptance of the waste gas. Relatively small cyclone diameters have been selected. Aproximately the same speed is maintained in the uncleaned and cleaned section. The new design has proved to be excellent. Mass production of the filter has been begun.

19332 APTIC NO. 38460

Kellogg (M. W.) Co., Piscataway, N. J., Research and Engineering Development

EVALUATION OF SO2-CONTROL PROCESSES. (FINAL REPORT). *Office of Air Programs Contract CPA 70-68, Rept. APTD-0807, RED-71-12, Task 5, 271p., Oct. 15, 1971. 46 refs.*

NTIS: PB 204711

The technical and economic evaluations of the feasibility of various sulfur dioxide removal processes are presented. The applicability of the process evaluations to both power plants and SO2 control processes and the impact of SO2 control technology on emission reduction were also studied. Preliminary process designs, control efficiency, capital and production costs, and prOduction and credit for projected by-products were evaluated for limestone wet scrubbing, limestone dry injection, catalytic oxidation, molten carbonate, potassium formate, ammonia scrubbing (base, steam stripping, and thermal decomposition), Tyco, magnesium oxide scrubbing, zinc oxide, and citrate processes. Of the twelve processes evaluated, none can be ranked as commercially available.

19333 APTIC NO. 38465

DEVICE FOR CATALYTIC AFTERBURNING OF AUTOMOBILE EXHAUSTS. *(Vorrichtung zur katalytischen Nachverbrennung von Kraftfahrzeug- Abgasen). Text in German. Wasser Luft Betrieb, 16(1):26, Jan. 1972.*

Familiar catalytic afterburners, for automobile exhausts usually consist of little spherically shaped ceramic carriers for the catalyst. They also may be rod or tablet-shaped. They are accommodated in a container and installed into the gas flow. Through the vibrations of the automobile the ceramic carriers are constantly moved and through friction the catalyst layer is partially eroded. This disadvantage can be avoided by using a metal fiber material as basis for a catalyst which develops from the fiber material. The afterburner in this case comprises a casing with a plate of metal fibers which holds sintered self-supporting cylindrical bodies. Between the metal fibers within the cylindrical body, the ceramic material with a catalyst is accommodated.

19334 APTIC NO. 38466

ELECTRODES FOR FLUE GAS ELECTROSTATIC PRECIPITATOR. *(Elektroden fuer Rauchgas-Elektrofilter). Text in German. Wasser Luft Betrieb, 16(1):26, Jan. 1972.*

The highest electrodes of the world were built for the dust collector in a soft coal-fired power plant. They are 13.75 m high. Ten years ago the collection electrodes had a maximum height of 7.5 m. The electrodes are sturdy and maintain a stable electric field. The new electrodes will be installed in two parallel connected electrostatic precipitators. In them the flue gas of two 600 MW plants will be cleaned. A collection efficiency of more than 99.6% is obtained. Each second 1700 cu m waste gas must be cleaned.

19335 APTIC NO. 38467

PLANT FOR CLEANING WASTE GASES FROM CONVERTER STACKS IN STEEL GENERATORS. *(Analage zur Reinigung der Abgase aus Konverterkaminen in Stahlerzeugern). Text in German. Wasser Luft Betrieb, 16(1):29, Jan. 1972.*

A converter waste gas cleaning system was developed which does not require a blower. The dust collector is installed on top of the converter workshop, thus to a large extent utilizing the natural buoyancy of the waste gases. An electrostatic precipitator is located somewhat to the side of the converter stack. On the upper end of the stack, a venturi scrubber is horizontally arranged. The outlet of the electrostatic precipitator is open and stack-shaped.

19336 APTIC NO. 38468

EXHAUST GAS AFTERBURNER CONNECTED TO AUTOMOBILE ENGINES. *(Abgas-Nachverbrennungseinrichtung an Kraftfahrzeugmotoren). Text in German. Wasser Luft Betrieb, 16(1):28, 1972.*

The afterburner consists of an inlet, an inlet chamber, an outlet, and a device which introduces additional air into the inlet chamber in a rotary movement. Furthermore, the afterburner has a combustion chamber which is connected on one end with the inlet and on the other with the outlet. The air from the inlet chamber is passed in spiral movements around the combustion chamber. An ignition device and a flame supporting rod are arranged in the combustion chamber. A flow deflection device for the burning gas can be used for heating the wall of the inner casing so that the air entering between the wall of the inner casing and the wall of the outer casing is preheated.

19337 APTIC NO. 38469

DUST COLLECTOR. *(Entstauber). Text in German. Wasser Luft Betrieb, 16(2):66, Feb. 1972.*

A new multi-cell filter for dust collection has been developed which has a high collection efficiency and a low resistance. The dirty gas flow enters tangentially into the inlet. The individual cyclones are arranged in steps. The cyclone diameter is relatively small. Approximately the same speed is maintained in the dirty and clean gas flow. The filter has proved its suitability in practice and is now mass produced.

19338 APTIC NO. 38525

GAS CLEANING SYSTEM FOR NON-FERROUS-METAL-MELTING FURNACES. *(Gasreinigungsanlage fuer NE-Metall-Umschmelzoefen). Text in German. Giessereipraxis, no. 4:65-66, Feb. 1972. 1 ref.*

In three oil-fired drum furnaces, brass, red brass, and bronze are produced. Red brass is obtained by adding chlorine gas. Through the chlorination, zinc, iron, and other substances are removed from the melt and carried off in the form of metal chlorides by the waste gas or by the slag. The metal chloride-containing waste gases are passed to a saturizer with a temperature of 450 C where the waste gas is cooled to 60 C by injection of circulating water. Part of the coarse dust is removed with the non-evaporated water and carried off to the water purification tank. The cooled gas passes on to a vertical venturi scrubber with fresh water injection. The gas is accelerated from 20 m/sec to 100 m/sec. An intense contact between the dust particles and the water mist is achieved; in the widening cross section of the venturi tube, the mist is condensed. In the following separator, the dust-laden water droplets are retained and likewise passed to the water purification tank.

19339 APTIC NO. 38567

MICRO-DUST PARTICLE REMOVAL FROM GASES AND FOGS. *(Lavage de micro-poussieres, gaz et buees). Text in French. Tech. Moderne, no. 12:408, Nov. 1971.*

A venturi scrubber is described in which the fan, dust collector, and sludge tank are incorporated in a single unit. A cleaning spray tube, water-level indicator, and level control are provided, and an automatic drain valve can be built in when required. The dust separation is made in two stages. The major part of the dust is separated in a wet cyclone, while the final cleaning is made in the venturi scrubber with water injection. The kinetic energy is partly recuperated by a diffusor following the venturi scrubber. The water-gas mixture is separated underneath the equipment, and the purified gas is drawn out by a fan. As recycled water is used evaporation losses only occur, the level drop being about 30 mm/hr. The pressure drop is 300-1000 mm of water column. The equipment can be used for vapors from chromium baths, sulfur dioxide, hydrogen sulfide, and sulfuric acid.

19340 APTIC NO. 38628

(Inventor not given.)

PROCEDURE AND EQUIPMENT TO ACHIEVE INDUSTRIAL SORPTION PROCESSES. *(Verfahren und Vorrichtung zur Durchfuehrung von industriellen Sorptionsvorgaengen). Text in German. Politechnika Slaska im. W. Pstrowskiego, Gleiwitz (Poland)) W. Ger. Pat. Appl. 1,642,861. 7p., Jan. 30, 1967. 3 refs. (3 claims).*

The process and equipment design for a sorption column with an ion exchanger or molecular filter adapted to a commercial scale are presented. The ion exchanger or molecular sieve is fitted into the column as an insert with sealed top and bottom caps. The top cap has a stop cock and vacuum gauge; several feed tanks are connected to the inlet via valves. The outlet from the tank is connected through valves to several evacuated collector tanks which are in turn connected to a vacuum plenum chamber and pump. Before the effluent is introduced into the column for desorption of ions, an ion-containing fluid is passed through the column and evacuated again to reduce the pressure to achieve complete removal of the fluid. Similar processes used water vapor at 120 C for flushing the column, which usually ruined the ion exchanger or molecular sieve.

19341 APTIC NO. 38638

(Inventor not given.)

EQUIPMENT FOR WET-PURIFYING DUST-LADEN GASES. *(Vorrichtung zur Nassreinigung staubhaltigen Gases). Text in German. (Societe Industrielle Delattre-Levivier, Courbevoie (France)) W. Ger. Pat. Appl. 1,671,403. 3p., Feb. 27, 1967. 4 refs. (1 claim).*

The design for an apparatus for the wet purification of dust-laden stack gases is presented. The equipment consists of a set of identical parallel venturi scrubbers to be operated either fully open or closed, which are mounted around a similar venturi scrubber that can be adjusted to any desired degree of opening. The outlets from these washers lead into a common flue. The arrangement presents better adjustment of the gas velocity in the venturi scrubbers than that in similar setups where the individual scrubbers are either open or closed and the total flow cross section can be adjusted only in rather coarse steps.

19342 APTIC NO. 38643

POLLUTION CONTROL POLICY IN 12 COMPANIES IN TOHOKU-DISTRICT. *(Tohoku 12-sha no kogai boshi taisaku). Text in Japanese. Netsu Kanri (Heat Management: Energy and Pollution Control), 24(2):21-26, Feb. 1972.*

This introduces anti-pollution measures taken or planned by 12 representative industrial firms located in the Tohoku District or the northern part of Honshu. In the Kirin Brewing Co. plant where carbon heavy oil is used as fuel, the effort for minimization of sulfur dioxide, dust, and soot emission is centered around using low-sulfur fuel oil as much as possible. The sulfur content of the fuel used in the past years is a 2.7% in average. Frequent inspection of the boilers, measures to ensure effective atomization of the fuel and the optimum air/fuel ratio for perfect combustion under varying load requirements or conditions, and the use of uniform-quality fuel oil have reduced the emission of air pollutants in this plant. It is presently technically not feasible to install dust collectors and desulfurization facilities there, thus the only practical anti-pollution measure left for the plant is the use of a lower sulfur-containing fuel. In the Nitto Spinning Co. plant, the measures planned include installation of continuous sulfur oxides recorders, dust collectors, desulfurizing devices, and silencers. In the Marusan Paper Manufacturing plant, the anti-pollution facilities include dust collectors, noise silencers, water-bath type deodorizing tanks, vibration-absorbing walls and chimneys for effective diffusion of SO2. In the Nakos Power Plant of Joban Kyodo Thermal Power Co., a dust collector is installed for each boiler. For observation of combustion in the boilers, a smoke densitometer and gas ozone meter plus ITV are used and the observation made from the central control room. The pollution control measures planned or implemented at the other firms were also discussed in the same manner as above.

19343 APTIC NO. 38648

ASARCO DEDICATES HAYDEN ACID PLANT. *Mining Congr. J., 58(3):28-29, March 1972.*

The American Smelting and Refining Company s new $17 million sulfuric acid plant at its Hayden, Arizona, copper smelter cuts sulfur dioxide emissions from the smelter in half and also removes dust and particulate matter from the converter smoke stream. Asarco s new plant is the first in the United States to employ the Chemiebau-Zieren process. The process starts at the Hayden smelter s five converters, where sulfur is removed from the copper by converting it into sulfur dioxide through oxidation. The product of this operation is blister copper. Gas leaving each converter is cooled in a water-cooled hood; following this, copper-rich dust drops out of the gas stream and is returned to the smelter. Flues 5 ft in diameter leading out of the converters direct the gas flow into cyclone banks and, from the cyclone banks, the gases discharge into a common header for four 3-stage Chemiebau hot-gas electrostatic precipitators. The clean gas, still relatively hot, then passes through a weak acid tower where the minor amounts of sulfur trioxide formed in the converters are made into a weak sulfuric acid. Remaining gas, mostly sulfur dioxide, is cooled and washed in another series of towers. Four parallel two-stage Chemiebau wet-gas electrostatic mist precipitators take out any remaining dust and particulates. Acidic scrubber water plus the weak acid is used later to make a salable 75% acid. Moisture-laden sulfur dioxide gas is dried in a tower, irrigated with 94% sulfuric acid, and sent by two 2500 hp single-stage centrifugal blowers into the contact plant.

19344 APTIC NO. 38651

REMOVAL OF THE GASES IN A CZECHOSLOVAKIAN VARNISH ENTERPRISE. *(Abgasbeseitigung in einer tschechischen Lackfabrik). Text in German. Farbe Lack, 78(1):89, Jan. 1972.*

From the esterification boiler used for the production of synthetic lacquers, a mixture of solid, liquid, and gaseous substances is emitted forming a white smoke with a pungent odor. New equipment has been developed to utilize these emitted substances for the production of special resin lacquers. The new equipment consists of a cooled discharger for solid and condensable substances and a thermo-reactor for the thermal oxidation of the remaining substances. The discharger consists of a cabinet of a diameter of 500 by 250 mm and a tube system arranged in twelve floors. The tubes are first cooled with water so that the solid substances contained in the flue gas settle down on the tube surface while, at the same time, the liquid reaction products are condensed. At the end of the gas development steam is fed into the tubes so that the sedimentated substances are heated and transformed into a pasty substance flowing on the bottom of the discharger from where it can be easily removed. The flue gases emitted from the discharger are fed into the thermo-reactor where the organic substances still contained in the gas are removed at a temperature of 600 C.

19345 APTIC NO. 37914

Achorn, Frank P. and J. S. Lewis, Jr.

EQUIPMENT TO CONTROL POLLUTION FROM FERTILIZER PLANTS. *Ag Chem Commer. Fert., 27(2):10-14, Feb. 1972. 5 refs. (Presented at the Fertilizer Roundtable, Memphis, Tenn., 1971.)*

The efficiency and applicability of various control methods for use in fertilizer plants are reviewed. The use of impingement-type scrubbers, wet cyclones, venturi scrubbers, packed bed scrubbers, and some process modifications to control emissions of ammonia, chlorine, fluorine, phosphoric acid, and dusts from specified processes is examined.

19346 APTIC NO. 38437

Adair, James G. and Harold L. Boots

CONTROL SYSTEM FFOR BAG FILTERS. *(Phillips Petroleum Co., Bartlesville, Okla.) U. S. Pat. 3,630,004. 4p., Dec. 28, 1971. 7 refs. (Appl. March 3, 1969, 4 claims).*

Most bag filter systems require repressuring cycles for different compartments of different lengths. It is necessary to shut down the entire operation to adjust these time periods. To provide complete flexibility in the repressuring of the compartments, a control system was devised. The bag filter system has an off-gas conduit communicating with each compartment. Each conduit includes a valve controlling the discharge of off-gas and a valve regulating the introduction of repressuring gas to its associated compartment. The valves are sequentially controlled to close the off-gas conduit of each compartment for a predetermined period and admit repressuring gas for a predetermined shorter period. (Author abstract modified)

19347 APTIC NO. 37825

Adams, Clark E. and Charles N. Kimberlin, Jr.

TWO-STAGE DESULFURIZATION UTILIZING HYDROGEN IN THE SECOND STAGE REACTION. *(Esso Research and Engineering Co., Baton Rouge, La.) U. S. Pat. 3,591,489. 4p., July 6, 1971. 6 refs. (Appl. Jan. 24, 1969, 3 claims).*

Petroleum fractions boiling above 200 F can be desulfurized in two stages in the presence of a sulfur resistant catalyst, the first stage being carried out in the absence of hydrogen and the second in the presence of hydrogen. The catalyst deactivates rapidly in the first stage and is regenerated by stripping with hydrogen or mixtures of hydrogen and hydrogen sulfide. Suitable catalysts are a Group VI-B compound, specifically a molybdenum or a tungsten compound, together with a Group VIII compound, specifically a nickel or cobalt compound. (Author abstract modified)

19348 APTIC NO. 38472

Afzal, M.

THERMODYNAMICS OF ADSORPTION OF ORGANIC VAPOURS ON CARBON BLACK. *Kolloid Z.Z. Polym., 248(1-2):1026-1029, 1971. 14 refs.*

An apparatus for the adsorption of gases on solids was used to calculate the specific surface of carbon black by the adsorption of nitrogen gas at liquid air temperature. The adsorption of methanol, methyl formate, methyl acetate, methyl cyanide, acetaldehyde, and methyl ethyl ketone on carbon black was measured at a number of temperatures between 0 and 40 deg. Adsorption isoteres were calculated from a series of isotherms at different temperatures by using the Clausius-Clapeyron equation. The heats of adsorption are generally consistent with the idea of two adsorption processes, one with a small activation energy and one with a larger activation energy. (Author summary modified)

19349 APTIC NO. 38316

Alpert, Seymour B., Ronald H. Wolk, Peter Maruhnic, and Michael C. Chervenak

HYDROCRACKING AND DESULFURIZATION WITH A CATALYST HAVING MICROPORES AND ACCESS CHANNELS. *(Hydrocarbon Research, Inc., New York) U. S. Pat. 3,630,888. 12p., Dec. 18, 1971. 9 refs. (Appl. March 2, 1970, 8 claims).*

A process for carrying out catalytic reactions, e.g., hydrogenation desulfurization, hydrocracking, and high rate conversion operations in the petroleum field, is presented. Prior art catalysts have not solved the problem of providing sustained efficient catalytic activity and sustained availability of subsurface micropores. The present technique is based on the premise that the prolonged sustained extent of diffusion of feed material into a catalyst is the controlling factor with respect to catalyst life, efficiency, and process operability and that the extent of diffusion is determined by the distribution and structure of large-sized access channels in the catalyst. The access channels of the catalysts are interstitially spaced throughout the micropores; 10-40% of the total pore volume is composed of access channels with diameters greater than 1000 A and 10-40% of access channels with diameters of 100-1000 A. The channels are substantially uniform as to their parameters and are relatively straight with minimum bending and constriction. The remaining 20-80% of the total pore volume comprises micropores with diameters less than 100 A. Methods for catalyst preparation with respect to orientation of the access channels are described. (Author abstract modified)

19350 APTIC NO. 37910

Anderson, Chester A.

SMOKE WITH AUTOMATIC CONTROL SYSTEM THEREFOR. *(Speco, Inc., Schiller Park, Ill.) U. S. Pat. 3,573,223. 7p., March 30, 1971. 6 refs. (Appl. Oct. 14, 1968, 8 claims).*

A control system for a friction-type smoke generator is described, wherein the pressure which is exerted by the wooden smoke-producing block against the usual rotating friction wheel is regulated according to the electrical current which is supplied to the motor for driving the wheel. Previously, where smoke generation has been effected by the voluntary smothering of burning materials, the problem of attaining uniform smoke density in a smokehouse or other enclosure has presented almost unsurmountable operational problems. (Author abstract modified)

19351 APTIC NO. 38033

Andrew, Don

VAPOR RECOVERY INCREASES PROFIT IN FAIRWAY UNIT. *World Oil, 174(2):25-27, Feb. 1, 1972.*

During the first 12 months of operation, a stock-tank vapor recovery system for five modern consolidated batteries in a gas plant has recovered 482 MMcf vapor at an average 1320 Mcfd. As a result, the ratio of gas liquid recovery to produced oil has nearly doubled. Vapor recovery starts when stock-tank pressure reaches 2 in. of water. Air-cooled, single-stage, multivaned rotary compressors start at this pressure and continue as long as it is maintained. If stock tanks decrease to 0.5 in. water, a second pressure switch will shut the unit down. A third pressure switch prevents excessive compressor starting and stopping. An inlet suction scrubber in each vapor recovery unit traps liquids and scrubs compressor gases. Costs are mentioned.

19352 APTIC NO. 38450

Aoi, Katashi

EXHAUST MUFFLER FOR INTERNAL COMBUSTION ENGINES, ESPECIALLY FOR MOTOR VEHICLES. *(Auspufftopf fuer Brennkraftmaschinen, insbesondere von Kraftfahrzeugen). Text in German. (Assignee not given.) W. Ger. Pat. 1,576,748. 7p. Jan 5, 1972. 2 refs. (Appl. Jan. 31, 1967, 6 claims).*

A muffler for internal combustion engines is presented. The muffler system includes a series of pipe-connected chambers which are coated with a filter fabric and closed by perforated plates. A vortex separator mounted coaxially to the exhaust is fixed by means of an annular jacket with diametrically opposed slotted baffle plates. The jacket is provided with a removable pulp trapping collector applied on the bottom. In addition there is an overall pulp collector which is subdivided into compartments serving each individual filtering space; this collector communicates with the jacket collector. The muffler is provided with an overall pulp collecting tank which includes an exhaust pipe, an internal container, and an outlet valve. The walls of the internal container are permeable for particles dissolved within the pulp and contain a neutralizer for these particles.

19353 APTIC NO. 38663

Aoki, Teruo

DUST COLLECTOR. *(Shujin sochi). Text in Japanese. (Assignee not given.) Japan. Pat. Sho 46-40992. 3p., Dec. 3, 1971. (Appl. June 4, 1969, 1 claim).*

The dust collection chamber is divided by a separation board into the upper and lower chambers. The upper room is a spray chamber where the combustion gas is jet sprayed by the water supplied through a number of nozzles on the wall. On the separation board are a number of double pipes protruding into the lower chamber. The top of the inner pipe has a turned down brim which almost touches the top of the outer pipe. The water from the nozzle flows down and some of it enters the inner pipes which have closed bottoms and many pores on all sides. Water forms film over the pores. The combustion gas that has been cleaned by the spray above will escape through the pores through the water films. The overflowing water from the inner pipes will flow into the outer pipes, forming another film across the gaps between the outer and inner pipes. The gas escaping through these gaps will be also cleaned. The lower chamber is also sprayed by water jet nozzles. The water is received in the tank under the two chambers. The clean gas moves horizontally from the lower chamber toward the stack. The stack gas is completely cleaned after going through many water films.

19354 APTIC NO. 38618

Archer, A.

POLLUTION CONTROL AT FARBENFABRIKEN BAYER LEVERKUSEN WEST GERMANY. *Environ. Health, 80(2):42-46, Feb. 1972. 1 ref.*

Air and water pollution control measures adopted by the Farbenfabriken Bayer A. G. in Germany, which deals in plastics, synthetic fibers, dyes, pharmaceutical products, and crop production products, are reviewed. The first approach of the company was to set up a sampling network consisting of automatic continuous sulfur dioxide monitors, wind recorders, and instruments for detecting odors and measuring dust, carbon monoxide, carbon dioxide, hydrogen sulfide, nitrogen oxides, and hydrocarbons. Instrument development and operation are discussed. The large scale plant designed to handle solid and liquid waste disposal problems consists of a banker and a prepulveriser for large waste; a rotary kiln; an afterburner; a steam boiler; an electrostatic precipitator; a combustion chamber and washing unit for hydrochloric acid wastes; a furnace to burn out metal drums; a burner for liquid wastes; a slag trough; and a stack 100 m high. Waste acid is transported to the sea and discharged, ensuring a dilution of 1:7000. Liquid organic wastes are combusted at sea at temperatures above 1200 C and the high humidity of the sea air ensures absorption of the waste gases.

19355 APTIC NO. 38703

Auckland, John Raymond

FILTER FOR GAS CLEANING. *(Filter zur Gasreinigung). Text in German. (Auchard Development Co., Ltd., Southam (England)) W. Ger. Pat. Appl. 1,607,666. 8p., Jan. 2, 1968. (13 claims).*

The design for an air cleaning filter with an element exposure adjustment is presented. Only part of the filter surface is exposed at once, with the other unsoiled part ready for release after use for a given time or when its flow resistance has risen to a given value. The whole filter surface is fitted in a gas path limiter with an adjustable closure to control exposure. The advantage of the adjustable filter over a static filter is the longer filter life time and the constant pressure loss that is easily maintained until the entire filter area of one element is used completely.

19356 APTIC NO. 37879

Badin, Elmer J.

SMOKE SUPPRESSANT COMPOSITIONS FOR PETROLEUM FUELS. *(Cities Service Oil Co., Tulsa, Okla.) U. S. Pat. 3,615,292. 10p., Oct. 26, 1971. 11 refs. (Appl. Nov. 26, 1968, 15 claims).*

Coupled with the specific need for a diesel fuel mixture with reduced smoke characteristics, there is also an urgent need for liquid hydrocarbon fuel mixtures having improved combustion characteristics for spark ignition and jet engines. Certain metallic smoke suppressant mixtures have been employed in compression ignition engines, but objections to these mixtures are that they leave deposits in engine crankcases as a result of blowby from the cylinders, are expensive to produce and package, and can form undersirable combustion products in proportion to their content of metal. A smoke suppressant additive is described which comprises an ether, a Group IIA metal carboxylate, and a Group IIB metal carboxylate. A preferred fuel additive is a mixture of an alkyl ether of ethylene glycol and barium and zinc alkanoates wherein the weight ratio of ether to total carboxylates is from about 4:1 to

1:1. Another additive is obtained when a Group IIA metal sulfonate, especially a barium alkaryl sulfonate, is incorporated into the carboxylates-ether additive mix. An additive mixture having a ratio of about 1 to 2 parts ether and 1 to 2 parts of barium alkaryl sulfonate/part barium and zinc alkanoates is particularly suitable. (Author abstract modified)

19357 APTIC NO. 38075

Badin, Elmer J.

SMOKE SUPPRESSANT ADDITIVES FOR PETROLEUM FUELS. *(Cities Service Oil Co., Bartlesville, Okla.) U. S. Pat. 3,594,138. 6p., July 20, 1971. 13 refs. (Appl. Jan. 2, 1968, 6 claims).*

A diesel fuel mixture having reduced smoke characteristics and improved oxygen stability is presented. A metal salt of an alkanoic acid is dispersed in a liquid hydrocarbon fuel, wherein the concentration of the metal salt is usually from 0.05 to 5% by weight. Diesel fuels having from about 0.3 to 2% by weight of barium 2-ethylhexanoate, or from about 0.1 to 2% by weight of calcium 2-ethylhexanoate, are especially effective soot and smoke reducing additives.

19358 APTIC NO. 38455

Baier, Heinz

THE SOFT COAL STEAM POWER PLANT MEGALOPOLIS IN GREECE. *(Das Braunkohle-Dampfkraftwerk Megalopolis in Griechenland). Text in German. Brennstoff-Waerme-Kraft, 24(3):90-93, March 1972. 4 refs.*

A megalopolis power plant in Greece consists of two blocks 125 MW each for producing steam with 140 atm gage and 535 C. A natural-draft cooling tower is attached to each block. Six electrostatic precipitators, one for each boiler, are installed on the roof of the power plant. Considerable quantities of water vapor from drying the soft coal are discharged into the atmosphere (about 300 t/hr, 150 t/boiler). Both blocks have a common stack with a height of 120 m. The fly ash retained in the electrostatic precipitators is pneumatically transported to the ash bunker. The air for pneumatic transport is drawn off by a blower from the fly ash bunker and passed to a tubular bag filter for dust cleaning. The wetted fly ash, together with the slag, is transported to the dump site 2.5 km away. Four vehicles with a loading capacity of 32 cu m each are available for tm½sporting the ash.

19359 APTIC NO. 37881

Baigas, Joseph F., Jr.

AIR FILTER ASSEMBLY PROVIDING INCREASED FILTERING SURFACE AREA FOR A GIVEN VOLUMETRIC SIZE. *(Aeronca, Inc., Middletown, Ohio) U. S. Pat. 3, 606,735. 9p., Sept. 21, 1971. 10 refs. (Appl. July 1, 1969, 25 claims).*

The bulk or volumetric size of the filter required to provide sufficient filter surface area in cylindrical or drum-type filters presents problems. Adequate cleaning of the filtering surfaces also has presented a problem inasmuch as the velocity of air flow through the air filter is dependent upon keeping the filter media relatively clean. An improved air filter and air filter assembly is described which has increased filter surface area for a given volumetric size and which includes an improved cleaning means to allow a higher velocity of air flow to pass through. The apparatus comprises a support cage having a generally cylindrical hollow base portion and a plurality of radially extending, hollow, perforated protuberance portions projecting longitudinally outward from the base portion. The number of protuberance portions is related to the diameter of the cylindrical base, with approximately 3-5 protuberances/ft of diameter of the base portion. Flexible filter media are disposed around and secured to the outside surface of the protuberance portions. (Author abstract modified)

19360 APTIC NO. 38442

Baker, Bernard S., Jack Huebler, Henry R. Linden, and John Meek

PROCESS FOR SELECTIVE REMOVAL BY METHANATION OF CARBON MONOXIDE FROM A MIXTURE OF GASES CONTAINING CARBON DIOXIDE. *(Consolidated Natural Gas Service Co., Inc., Pittsburgh, Pa.; Southern California Gas Co., Los Angeles; and Southern Counties Gas Co., Los Angeles, Calif.) U. S. Pat. 3, 615,164. 11p., Oct. 26, 1971. 3 refs. (Appl. Jan. 10, 1968, 11 claims).*

When carbon monoxide impurities are present with a hydrogen gas which is to be used in an acid fuel cell, the CO has been found to adversely affect the operation of the fuel cell as it poisons the noble metal electrodes utilized by the cells. Known methods for the removal of CO involve either methanation or selective oxidation of the CO, but difficulties with these methods are that the hydrogen available for fuel is consumed. In the present process, the CO is selectively methanated in the presence of a high proportion of carbon dioxide by heating the gaseous mixture at about 100-220 C in the presence of a ruthenium or rhodium catalyst on an alumina support. (Author abstract modified)

19361 APTIC NO. 38066

Barefoot, Bernard B.

FLUE GAS SCRUBBER. *(Assignee not given.) U. S. Pat. 3,623,297. 5p., Nov. 30, 1971. 2 refs. (Appl. June 23, 1969, 1 claim).*

An apparatus and method are presented for removing particulate matter from gases which exit from a cupola, electric melting furnace, basic oxygen furnace, or the like. A small circular horizontal plate or disc is held inside the tapered throat of a scrubber and moved vertically in the throat by an overhead mechanism connected by a hollow rod for increasing or decreasing the cross-sectional area between the periphery of the disc and the wall of the tapered throat. Water is introduced by pipe into the hollow rod above the circular disc and falls downward inside the hollow rod to an outlet located centrally on top of the circular disc surface. The water flows over the top of the disc surface to the periphery of the circular disc and is atomized at its periphery by shearing action caused by the downward velocity of the gas extracted from the apparatus by an induced draft fan. The shearing action causes the water to atomize into small droplets which then collide and wet the particulate matter. (Author abstract modified)

19362 APTIC NO. 38617

Barnea, Matei and Pascu Ursu

METHOD OF THE CONTROL AND THE COMBATING OF AIR POLLUTION. *(Metode de control si combatere a impurificarii aerului). Text in Romanian. In: Protectia atmosferei impotriva impurificarii cu pulberi si gaze. Bucharest, Romania, Editura Technica, 1969. Chapt. 10-13, p. 186-366. 255 refs.*

Control and measurement methods for air pollution are reviewed. Included are discussions on sampling techniques by aspiration or sedimentation for air involving suspended particulate matter. Reviewed are physical chemical and combined analytical methods for air pollution measurement. Air pollution control through systematic territorial improvements such as development of green areas and judicious mapping of industrial plants in taking into account the geographic and meteorological factors of a given region is discussed. Control equipment including centrifugal or electrostatic particulate separators and various types of wet scrubbers is described with recommendations as to their specific utilization under different industrial conditions. Discussions include technical design criteria and mathematical analysis of the variety of factors affecting their operating conditions. A historical and geographical review on legislation and development of air pollution criteria and standards is included.

19363 APTIC NO. 38448

Bearce, W. E.

ENVIRONMENTAL CONSERVATION. *Mining Engineering, 24(2):114-117, Feb. 1972.*

Progress being made by the coal industry in controlling air, water, and land pollution is reviewed. Thermal dryers, which are the greatest potential contributors of dust to the atmosphere around a plant or cleaning plant, are now often operated in connection with a wet scrubber. Airborne dust from lagoons is controlled by neutralization with lime, followed by seeding with grass and fertilization. Limestone is capable of neutralizing acid mine water and has potential for real savings in acid-water treatment. Another water-treatment process under investigation involves bringing an activated carbon catalyst in contact with iron, which is subsequently oxidized or absorbed on the surface of the catalyst from which it may be washed off. Work is also being conducted on processes producing essentially mineral-free water. These include reverse osmosis, electrodialysis, ion exchange, and flash distillation. There is a drift toward federal control of all surface mining activities and the reclamation of land thus disturbed. A type of prickly locust and a type of aspen show great promise as good soil stabilizers under very acid conditions. The impoundment of water is also an important part of land reclamation; where the soil is of such a nature that it does not make an impermeable barrier, chemicals are available for sealing such structures.

19364 APTIC NO. 38111

Berg, G. J. van den, P. J. J. van Doorn, and W. A. Haeberli

POWER STATIONS WITH SULPHUR-FREE FLUE GAS. *(Kraftwerke mit schwefelfreiem Abgas). Text in German. Verfahrenstechnik, 5(10):406-408, Oct. 1971. 6 refs. (Includes a critique, VDI (Ver. Deut. Ingr.) Z. (Duesseldorf), 113. (17):1366, Dec. 1971.) (Presented at the Seminar Ueber Entschwefelung von Brennstoffen und Verbrennungsgasen der vereinten Nationen, Wirtschaftskommission fuer Europa, Genf, Switzerland, Nov. 16-20, 1970.)*

Heavy hydrocarbons are partially gasified to produce synthesis gas and hydrogen. The soot obtained at the process is recirculated. For sulfur-free operation, a sulfur recovery plant adjoins the processing plant. The desulfurized gas is stepwise burned for power production. Such a power plant which practically emits no sulfur comprises the following units: a reactor for partial oxidation, a waste heat boiler, a gas scrubber (from where the soot is returned to the reactor for re-use as fuel), the desulfurization unit, the unit for partial combustion of the gases from the reactor, the high-pressure turbine, the steam boiler with overpressure firing, the low-pressure gas turbine, the heat conveyer for preheating the reactor gases prior to partial combustion (the waste gases of the low pressure gas turbine are used for this purpose), turbines and generators for producing electric power from the steam produced in the waste heat boiler and the overpressure steam boiler, generators for producing electric power in connection with the high and low pressure gas turbines, the blower for compression of the combustion and reaction air from the low pressure and high-pressure gas turbines, the sulfur recovery plant (Claus-furnace), and finally the water treatment plant and auxiliary devices. The operating costs including fuel costs for a 200 MW power plant are about $.001/kWh higher than those of a conventional power plant.

19365 APTIC NO. 38599

Berg, T. G. Owe

METHOD AND MEANS FOR THE REMOVAL OF LIQUID OR SOLID PARTICLES FROM A VOLUME OF GAS. *(Assignee not given.) U. S. Pat. 3,601,313. 5p., Aug. 24, 1971. 6 refs. (Appl. June 17, 1969, 14 claims).*

Most existing systems for removing particles from a volume of gas depend on subjecting suspended particles to some force which will drive them to a collecting surface. Because of the large volume of air involved, such systems are ineffective in dispersing fog. Methods that rely on charging water droplets to increase their scavenging efficiency are usually unsatisfactory because of the great relative velocity of a spray drop that is large enough to carry a substantial charge. The collection efficiency of equipment based on collection by impaction as a result of inertia is very poor for small particles. A new method for removing liquid or solid particles from a volume of gas has a collection efficiency exceeding that of conventional methods by orders of magnitude. The method is based on the electrostatic attraction by the scavenger of the particles to be scavenged and a small relative fall velocity of the scavenger combined with a large size and a large charge. A conventional bubble generator with a voltage source and charging device is used to produce a multiplicity of charged, individual bubbles substantially larger than the particles. The bubbles are then introduced into the volume of gas and, after attracting the particles, are precipitated out of the gas. The method will disperse fog, collect coal particles in a coal mine, collect particles during chemical manufacturing processes, and remove dust particles from effluent gases such as those resulting from combustion processes.

19366 APTIC NO. 38127

Bishop, Irving N.

INTERNAL COMBUSTION ENGINE INCLUDING MEANS FOR REDUCED EMISSIONS. *(Assignee not given.) U. S. Pat. 3,630,021. 8p., Dec. 28, 1971. 2 refs. (Appl. June 2, 1970, 11 claims).*

An internal combustion engine is described with a piston reciprocally mounted in the combustion cylinder and a head positioned over the combustion chamber. The cylinder head has an exhaust passage positioned within it and communicating with the combustion chamber and an exhaust valve positioned in the exhaust passage. Means are provided in the cylinder head for injecting air under pressure into the exhaust passage and into the combustion chamber during the expansion of the piston after the exhaust valve is opened and during the exhaust stroke. The air under pressure can be injected either continuously or sequentially into the exhaust passage and then into the combustion chamber subsequent to the opening of the exhaust valve. If air is injected into the cylinder or combustion chamber during the exhaust period to increas the oxygen concentration in the bulk gas; rapid oxidation of unburned hydrocarbon and carbon monoxide will occur. (Author abstract modified)

19367 APTIC NO. 37832

Bjork, Gust H.

POLLUTION AND NOISE REDUCING MUFFLER. *(Assignee not given.) U. S. Pat. 3,605,404. 3p., Sept. 20, 1971. 7 refs. (Appl. Sept. 29, 1969, 3 claims).*

Prior attempts to reduce the unburned hydrocarbon and carbon monoxide content in engine exhausts have principally been in the form of afterburners and catalytic converters for oxidizing the unwanted materials with excess air. However, neither of these systems has proved completely satisfactory under the wide variety of operating conditions which must be met in the operation of an automobile or similar engine in normal use. A simple muffler system is described which comprises a hollow tubular body with an exhaust gas inlet into one end and discharge from the other. The inlet end of the tubular body is disposed with its axis at an obtuse angle relative to the longitudinal axis of the muffler and it is spanned with a metal screening or similar material. The downstream end of the muffler functions as an aspirator to draw air through the body to preheat the air before admixture with the exhaust fumes adjacent the discharge end of the muffler. The muffler reduces pollution by promoting further combustion of combustible constituents of the exhaust gases. For maximum noise reduction the muffler body is of rectangular cross-section. (Author abstract modified)

19368 APTIC NO. 37985

Bjork, Gust H.

POLLUTION REDUCING MUFFLER. *(Assignee not given.) U. S. Pat. 3,611,714. 3p., Oct. 12, 1971. 8 refs. (Appl. Sept. 29, 1969, 7 claims).*

A muffler device for attachment to the exhaust manifold of an internal combustion engine is described for the reduction of the unburned hydrocarbons and carbon monoxide from the exhaust system of the engine. It comprises a hollow tubular body having an exhaust gas inlet into one end and discharge means from the other. The inlet end of the tubular body is lined with a foraminous material such as metal screening. A noise reducing muffler is attached to the discharge end. An aspirator connected to the breather tube of the crankcase of the engine is disposed in series between the gas inlet and the discharge end. The muffler reduces pollution by promoting further combustion of combustible constituents of the exhaust gases. Previously used afterburners and catalytic converters have not proved completely satisfactory under the wide variety of operating conditions which must be met in the course of operation of an automobile. (Author abstract modified)

19369 APTIC NO. 37949

Blanken, Guenther

HOW ONE TRIES TO SOLVE ANIMAL WASTE PROBLEMS IN THE USA? (Wie versucht man in den USA die Dungprobleme zu lopsen)? Text in German. Landtechnik, no. 23/24:609-612, Dec. 1971.

Because of the growing consciousness of environment problems, efforts have been made in the USA to solve the question of animal waste removal. The most economic method to dispose of animal waste is to place the waste in a lagoon. However, lagoons are not free from bad odors because of anaerobic decomposition processes. These odors can be reduced by ventilating the lagoons, thus submitting the manure to an aerobic treatment. Bad odors in stables can be reduced by using oxidation pitches under the box floors which are ventilated by means of a rotor. In order to avoid the development of gases during the fertilization of fields, tank trucks are used provided with two seed drills; behind them, the liquid manure is drilled into the soil by means of hose lines. Experiments have been made as to drying the manure by means of ventilating the air in the stable and by revolving the manure in the pitches below the animal boxes. As drying is effected very rapidly, no emissions are noticed, so that the dry manure can be stored without difficulties at the place of consumption.

19370 APTIC NO. 37976

Boido, Giuseppe

DEVICE FOR FUME REMOVAL BY DECANTATION PROVIDED WITH AN EJECTOR FUNNEL. *(Depuratore da fumo a decantazione e camino ad eiezione). Text in Italian. Lo Smog (Italy), 1970:15-18, 1970.*

If the velocity of smoke in a chimney is reduced to approximately 0.2 m/sec, particles suspended in the smoke precipitate and are separated; if normal flue velocity is then restored, smoke purification is achieved a device working on this principle can easily be constructed in any chimney which is at least 2 m high. The effect is achieved if smoke direction is by means of a 1 m high sheet iron hood turned into a downdraft and then oriented upward for a distance of at least 2 m to regain its original flow velocity. This decantation smoke purifier requires no servicing other than the periodic removal of soot accumulating at the bottom of the chimney. The chimney is constructed so that the smoke from the boiler furnace reaches the vertical flue duct by a horzontal inlet. The hood attached to the flue duct wall turns the smoke downward; when it reaches the lower edge of the open hood, the smoke turns upward having deposited most of its suspended particulates. A device of this type was installed in a Turin plant in 1938 in conjunction with two coal-fired boilers of 1 1/2 million cal output; 8 cu m soot/yr were removed from the two decantation chambers, and no soot deposit formed since then on neighboring roofs. An ejection chimney attachment of simple construction, without any mechanical or moving parts which increases flue draft when the wind is blowing, consists of two panels attached to and extending above two opposite sides of a quadrangular chimney. A top is placed on the two panels to form a roof, the other two opposite sides in the direction of the wind are left open with the top edge of the chimney wall executed at an incline to deflect the wind blowing in a horizontal direction upward and thus to accelerate the flow of stack gases. The height of the opening should be about 1/5 of the height of the chimney. If the opening is wider than 40-50 cm, a vertical divider is provided.

19371 APTIC NO. 38630

Borgwardt, Robert H. and Richard D. Harvey

PROPERTIES OF CARBONATE ROCKS RELATED TO SO2 REACTIVITY. *Environ. Sci. Technol., 6(4):350-360, April 1972. 16 refs.*

Petrographic examination and grain size-distribution measurements were made on 11 specimens representing a broad spectrum of limestones and dolomites. The sulfur dioxide reaction kinetics of calcines prepared from each rock type were determined at 980 C. Stones of various geological types yield calcines of distinctly different physical structures that show correspondingly large differences in both rate of reaction and capacity for SO2 sorption. Pore size and particle size together determine the extent to which the interiors of individual particles react. Particles smaller than 0.01 cm with pores larger than 0.1 micron react throughout their internal pore structure at a rate directly proportional to the BET surface. The rate decays exponentially as sulfation proceeds until the pores are filled with reaction product. The ultimate capacity of small particles is determined by the pore volume available for product accumulation, which is generally equivalent to about 50% conversion of the calcium oxide in limestones. Variations in effectiveness of carbonate rocks for flue gas desulfurization are explained by the physical properties of their calcines, which are related to the crystal structure of the original rock. The high reaction rates achieved in the limestone injection process apparently result from the large surface area existing for short periods immediately following the dissociation of calcium carbonate. (Author abstract)

19372 APTIC NO. 38416

Brady, Sidney O.

IN-PLANT POLLUTION CONTROL IN PRACTICE. 1. PETROLEUM INDUSTRY. *Chem. Eng. Progr., 55(3):45-48, March 1959. (Presented at the American Institute of Chemical Engineers, Annual Meeting, Cincinnati, Ohio.)*

Methods of in-plant control, i.e., the use of preventive measures to reduce the amount or strength of polluting wastes or to eliminate the production of certain wastes, are reviewed for water pollution problems in petroleum refineries. Engineering design, process design modifications, waste recovery and use, and local pretreatment or disposal are considered. Hydrofining, one of several new processes that eliminates or reduces production of contaminants, reduces air pollution as well by eliminating the acid treating of hydrocarbon streams. Acid treating produces acid sludges that are commonly burned under boilers with a resultant emission of sulfur dioxide. The gases and steam from a single stage evaporator used for concentrating sulfide-spent caustics are burned in a fume burner and discharged through a 150-foot stack to prevent air pollution.

19373 APTIC NO. 38256

Brannigan, P.G. and J.B. McQuitty

THE INFLUENCE OF VENTILATION ON DISTRIBUTION AND DISPERSAL OF ATMOSPHERIC GASEOUS CONTAMINANTS. *Can. Agr. Eng., 13(2):69-75, Dec. 1971. 15 refs.*

Conditions in pits used to store animal wastes are normally anaerobic; as a consequence, large quantities of carbon dioxide, ammonia, hydrogen sulfide, and methane are produced as a by-product of the anaerobic decomposition of the slurry. The effects of ventilation on the mean concentrations and the distribution patterns of NH3 and CO were investigated in an enclosed chamber representing a full-scale section of a pig barn. Facilities were installed in the chamber for the simulation of the sensible heat and gas production of 20 pigs. Independent variables were ventilation rate, outlet height, heat condition, distance from inlet, and height from floor. No practical differences were observed between the distribution patterns of the two gases. The ventilation rate was the only independent variable of importance in determining the concentrations of either gas. Under nonisothermal conditions, ventilation outlet height had a negligible effect on gas concentrations. An increase in gas concentrations from the inlet to outlet was observed. The sensible heat production appeared to be the major factor in the diffusion of both gases within the chamber.

19374 APTIC NO. 38071

Braxton, Henry G., Jr.

GASOLINE, DIESEL FUEL OR ANTIKNOCK FLUIDS CONTAINING AN EXHAUST EMISSION REDUCING ADDITIVE. *(Ethyl Corp., New York) U. S. Pat. 3,622,519. 6p., Nov. 23, 1971. 2 refs. (Appl. March 13, 1970, 16 claims).*

A method of reducing the combustion chamber deposit formation and the level of exhaust hydrocarbon emission normally observed during the life of an internal combustion engine is presented. Most previous attempts to reduce the initial hydrocarbon content of the exhaust gas have concentrated on mechanical means such as improved carburetion. In the present method, mono and di-alkanoates, aralkanoates, and benzoates of benzylidene bisphenols are added to the fuel or lubricant used in the engine.

19375 APTIC NO. 38299

Bridge, Alan C., Joseph Jaffe, and David S. Mitchell

DESULFURIZATION PROCESS EMPLOYING UPFLOW OIL AND HYDROGEN. *(Chevron Research Co., San Francisco, Calif.) U. S. Pat. 3,620,968. 4p., Nov. 16, 1971. 6 refs. (Appl. Oct. 31, 1968, 1 claim).*

A process for the catalytic hydrodesulfurization of hydrocarbon oils, particularly those containing a substantial proportion of material boiling above 500 F and containing 0.5-10% by weight of organic sulfur, is presented. The major advantages of the process over prior hydrodesulfurization processes lie in improvements of the activity and stability of the catalyst and of flow arrangements. The hydrocarbon feedstock, a major portion of which is in liquid phase during contact with the catalyst, is desulfurized by passing the oil and hydrogen upward in a cocurrent flow through at least one fixed bed of catalyst contained in a desulfurization reactor. The catalyst comprises pellets or other particles of alumina cogelled with a group VI hydrogenating component, a group VII hydrogenating component, group IV metal phosphate particles dispersed in the catalyst, and fluorine. The upflow oil and hydrogen operation with a cogel catalyst provide for higher activities and low initial fouling rates. (Author abstract modified)

19376 APTIC NO. 38207

Briggs, Southwick W.

POLLUTION CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINE. *(Assignee not given.) U. S. Pat. 3,568,437. 5p., March 9, 1971. 9 refs. (Appl. April 4, 1969, 6 claims).*

Many devices have been suggested and tried in attempting to provide for better combustion of the hydrocarbons and carbon monoxide in internal combustion engines. However, in many instances the devices have been unsuccessful and have not been able to reduce the pollution to meet present control standards, let alone the more stringent standards proposed for the future. A new and improved apparatus is especially adapted for reducing air pollution generated during the initial start-up and warm-up period of an engine. The apparatus will increase the air/fuel ratio of the mixture flowing into the combustion chamber during operation at lower power settings. It comprises an air intake conduit and a throttle valve.

19377 APTIC NO. 37961

Brzozowski, Stanley F.

TREATMENT OF TITANIUM TETRACHLORIDE WASTE GAS. *(PPG Industries, Inc., Pittsburgh, Pa.) U. S. Pat. 3,615,163. 4p., Oct. 26, 1971. 6 refs. (Appl. Dec. 15, 1969, 7 claims).*

Waste gases from the production of titanium tetrachloride by chlorination of titaniferous ores are commonly scrubbed before being vented to the atmosphere. During periods of extended production, a gelatinous-type material accumulates in the gas line handling the scrubbed waste gas stream and, by blocking the centrifugal blower in this line, causes shutdown of the entire process. In the method described, formation of this gelatinous material is avoided by treating the waste gas stream at temperatures below 200 C with steam in amounts sufficient to hydrolyze all the hydrolyzable metal chlorides in the stream before the scrubbing with water takes place.

19378 APTIC NO. 38062

Budininkas, Pranas, George A. Remus, and Jack D. Zeff

SULFUR DIOXIDE REMOVAL FROM A GAS. *(General American Transportation Corp., Niles, Ill.) U. S. Pat. 3,615,219. 11p., Oct. 26, 1971. 6 refs. (Appl. July 2, 1968, 11 claims).*

A process is presented for the removal of sulfur dioxide from a waste gas by treating the gas at an elevated temperature in the presence of a reducing gas and a catalyst for the reaction. If the gas containing SO2 contains too much oxygen, it is necessary to modify the process either by the use of additional reducing gas or by the pretreatment of the gas to selectively decrease the oxygen. Carbon monoxide, hydrogen sulfide, aliphatic hydrocarbons, and hydrogen may be used as reducing agents. Fly ash may be the catalyst. (Author abstract modified)

19379 APTIC NO. 37928

Burke, Robert F.

PROCESS FOR RECOVERING SULFUR VALUES FROM PYRITES BY SMELTING. *(Lummus Co., Bloomfield, N. J.) U. S. Pat. 3,615,220. 5p., Oct. 26, 1971. 6 refs. (Appl. April 1, 1969, 4 claims).*

An improved process is described for recovering sulfur values from the smelting of pyrites in a nonoxidizing atmosphere employing a carbon fuel. This is accomplished by adding a hydrogen containing gas to the off-gas from the smelting process, cooling the mixture from about 450 to 300 C, and contacting the gas with a Claus reaction catalyst to generate hydrogen sulfide. The sulfur dioxide in the off-gas is then reacted with the hydrogen sulfide, via the Claus reaction, to produce elemental sulfur which is recovered as a product.

19380 APTIC NO. 37831

Buttler, James Allen

AUTO EXHAUST TREATING MEANS. *(Walhamlin, Inc.) U. S. Pat. 3,605,389. 4p., Sept. 20, 1971. 1 ref. (Appl. March 24, 1969, 8 claims).*

An automobile exhaust treating method is presented for removing unburned hydrocarbons by collecting the solid matter carried by the exhaust gases and holding the gases in the presence of high temperatures. After arresting the flame in the exhaust gases, the velocity and back pressure are reduced, and the gases are cooled to cause condensation and precipitation of certain of the undesirable gases. While afterburners work to a certain extent, they often simply expand the materials to be eliminated further, by virtue of the heat generated, thereby making them less dense and more susceptaible to being absorbed in and carried by the atmosphere.

19381 APTIC NO. 38065

Calhoun, Roland B. and Robert H. Ernest

METHOD AND APPARATUS FOR LAUNDERING DUST COLLECTOS. *(Flex-Kleen Corp., Chicago, Ill.) U. S. Pat. 3,623,910. 5p., Nov. 30, 1971. 11 refs. (Appl. Nov. 28, 1969, 16 claims).*

A method and apparatus are presented for cleaning the interior walls and filter media of a conventional dust collector of the type that utilizes flexible bags for filtering airborne solids. The apparatus includes a set of sprinkler heads located in the top clean air plenum for introducing fresh water in the manner of a hard and uniform rain. The incoming water funnels into the bags and flows through in a backwashing fashion to progressively fill the tank and produce a ring of water discharging outward through the bags. A draft tube is provided centrally in the intake air plenum and is equipped with an impeller to produce a circulation pattern travelling parallel to the bags. (Author abstract modified)

19382 APTIC NO. 38433

Callahan, Joseph M.

PERFECT CIRCLE EMISSIONS CURBS. *Automotive Ind., 146(3):45-47, Feb. 1, 1972.*

Nitrogen oxide emissions from used cars are substantially reduced by a system combining exhaust gas recirculation (EGR) and spark advance. Lesser amounts of carbon monoxide and hydrocarbons are also eliminated. The system controls emissions by retarding engine spark until a car reaches 25-26 mph, when a flyball- governor speed control advances the spark and begins returning 10-17% of the exhaust to a spacer below the carburetor. The exhaust is piped to the carburetor area through a stainless steel tube for cooling purposes. Because cooler and more moist exhaust is injected into the engine induction system, driveability is not a problem as it is with other EGR systems. A modified version of the system has been developed for new cars.

19383 APTIC NO. 37930

Cardiff, George H.

ELECTROSTATIC AIR FILTERING MEANS. *(Assignee not given.) U. S. Pat. 3,626,669. 8p., Dec. 14, 1971. 5 refs. (Appl. Nov. 3, 1969, 3 claims).*

An electrostatic air filter is described which is a modular structural cell comprising an outer pre-filter panel, an inner particle collector area, and an ionizer area. Alternately chargeable and groundable plate members in the particle collector area form passageways for air to be filtered, and collect charged particles in the air during operation. Chargeable filaments are in the ionizer area, and during operation charge the particles to be removed from the air as they pass through the ionizer area. The pre-filter panel is held in mounted position by a resilient means which permits the panel to be removed for maintaining the modular cell. Previous electrostatic air filters were difficult to maintain and were generally limited in filtering capacity and compactness. (Author abstract modified)

19384 APTIC NO. 37931

Cardiff, George H.

ELECTRONIC AIR FILTER MEANS. *(Assignee not given.) U. S. Pat. 3,626,668. 10p., Dec. 14, 1971. 15 refs. (Appl. May 19, 1969, 3 claims).*

Previous electrostatic air filters have been generally limited in their filtering capacity and compactness, and were not readily operable for high flow rates to filter out smoke, tar, nicotines, and dust particles. An electronic air filter is described which includes duct mounted and wall mounted air filter structures, a plurality of ionizer assemblies, particle collector means, an after-filter agglomerator assembly, and control means to provide power for the proper charging of the particles. The particle collector units are readily removable for service and maintenance with a minimum amount of time and effort required. (Author abstract modified)

19385 APTIC NO. 38444

Clement, John L.

GASEOUS SULFUR DIOXIDE ABSORPTION SYSTEM. *(Babcock and Wilcox Co., New York) U. S. Pat. 3,615,165. 7p., Oct. 26, 1971. 2 refs. (Appl. Dec. 10, 1968, 2 claims).*

Magnesium base chemicals in liquid form have proven highly effective in removing sulfur dioxide gases from the products of combustion in the incineration of residual liquors. When used in the chemical recovery system of a pulp and paper installation, both the magnesium compounds and the SO2 absorbed in the magnesium may be reused in the chemical process. The SO2 absorption from flue gases may be applied to the products of combustion resulting from flue gases may be applied to the products of combustion resulting from both the incineration of pulp residual liquors and the combustion of other sulfur-containing fuels. In the latter case, the absorbed SO2 may be separately processed for reclamation of the sulfur components in a useable form. A system is described for the absorption of SO2 by passing the combustion gases in series through a plurality of direct contact zones. The absorption liquid is comprised of a solution of magnesium and sulfur which is sprayed into the gas, and the makeup water in the solution is selectively added into the last zone for optimum SO2 absorption efficiency of the entire system. (Author abstract modified)

19386 APTIC NO. 37842

Cohen, Irving and Harold J. Byrne

GAS SCRUBBING APPARATUS. *(Aqua-Air Systems, Corp., New York) U. S. Pat. 3,624,696. 5p., Nov. 30, 1971. 5 refs. (Appl. May 2, 1969, 4 claims).*

Most previous air and gas cleaners or scrubbers, while in general accomplishing their objectives, are unduly complex and bulky. They also are costly and tend to be inefficient. In the present apparatus, air contaminated with particles enters an enclosure at a relatively high velocity through an inlet passage which has water spray blanket projected across it. Within the enclosure, the air impacts against a water pool maintained at a constant level and has its direction of flow changed abruptly several times by a system of overlapping baffles. Turbulence is induced in this zone, and means are provided to induce some recirculation toward the water pool. The cleaned air expands through a moisture eliminator into a drying chamber and is discharged through the outlet of a blower which also serves to move the air through the entire apparatus. (Author abstract modified)

19387 APTIC NO. 37819

Connors, Harold D.

APPARATUS FOR REMOVING CONTAMINANTS FROM GASES. *(Avco Corp., Stratford, Conn.) U. S. Pat. 3,614,862. 4p., Oct. 26, 1971. 7 refs. (Appl. June 30, 1969, 5 claims).*

An apparatus is presented for separating and removing contaminant foreign particles from a gas or airstream. A plurality of cyclonic or vortex-type separating stages are assembled in serial flow arrangement so that only contaminant plus a small percentage of carrier air or gas is transmitted to each succeeding stage. Previous separating apparatus was not entirely satisfactory because of the considerable amount of blowers, ducting, weight, and size needed. (Author abstract modified)

19388 APTIC NO. 38006

Cornell, Dudley E., III

FILTERING AND MOISTURE CONTROL DEVICE. *(Assignee not given.) U. S. Pat. 3,619,988. 4p., Nov. 16, 1971. 9 refs. (Appl. Feb. 14, 1969, 11 claims).*

A filtering and moisture-control device is described, which produces a very gentle and non-turbulent flow of filtered air over the head of a person sleeping in bed to minimize asthma and allergy problems. The device includes a blower mounted in a housing. Air from the outlet of the blower flows into an elongated chamber extending horizontally in a direction transverse to the length of the bed. A combination filtering and evaporating member of porous material forms one wall of the chamber and has a low portion in a water pan which is provided in the lower portion of the chamber. Triangular side walls are formed of flexible transparent sheets, while the top wall extends angularly downward to define a conduit extending toward the sleeper s head. A micron filter is provided in the conduit and is so positioned as to produce a laminar flow of air. (Author abstract modified)

19389 APTIC NO. 37822

Costarella, Nino F. and Anthony A. Giuffre

AIR PURIFICATION SYSTEMS. *(Nino s Inc., Milwaukee, Wis.) U. S. Pat. 3, 628,311. 8p., Dec. 21, 1971. 8 refs. (Appl. July 7, 1969, 4 claims).*

A ventilating hood and duct structure for stoves are described, wherein a baffle and water spray arrangement within the hood force the smoke to pass through successive water curtains. Grease and other impurities are drained from the hood structure through a rectangular trough which overlies the fire area. (Author abstract modified)

19390 APTIC NO. 38281

Cotabish, Harry N., Frank W. Smith, and Wayne L. Smith

AIR FILTER CONTAINING FILTER BAGS. *(Mine Safety Appliances Co., Pittsburgh, Pa.) U. S. Pat. 3,616,625. 4p., Nov. 2, 1971. 3 refs. (Appl. March 4, 1970, 3 claims).*

The top, bottom, and sides of an upright rectangular outer frame are provided with longitudinal channels opening toward the inside of the filter frame; glued into these channels is a gasket. Filter bags behind the frame have open ends disposed side by side inside the frame. The top and bottom portions of the gasket are glued to the adjoining ends of the bags. A narrow rectangular inner frame is inserted in the open end of each bag with its top and bottom held in the top and bottom channels. A U-shaped clamping strip is disposed in each side channel and straddles the outer sides of the adjoining bag and inner frame to clamp them together. The outer side of each clamping strip is glued to the adjoining side portion of the gasket. This improved filter requires a minimum of rivets and has a good seal around the open ends of the bags. (Author abstract modified)

19391 APTIC NO. 37885

Crowley, J. D.

LACQUER REFORMULATION. *Paint Varnish Prod., 61(12):35-37, Dec. 1971.*

Los Angeles Rule 66 attempts to regulate organic solvent vapor emissions into tthe atmosphere by reducing the amount of branched chain emission products allowed. The immediate effect of these regulations on compounds is that there is a need for reformulated lacquers with reduced amounts of branched-chain products. Eastman Chemical Products has recently introduced methyl n-butyl ketone as a new commercial solvent. In addition to the advantage of its reduced photochemical reactivity, MBK is a medium evaporating solvent which, when used in coatings formulations, results in compounds with much lower viscosities than would be expected. Other0 advantages of MBK are cited, as well as the laboratory re of its physical properties.

19392 APTIC NO. 37838

Cullom, John T.

PROCESS UTILIZING THE SENSIBLE HEAT OF SMELTER GASES TO RECOVER SULFUR THEREFROM. *(Assignee not given.) U. S. Pat. 3,615,231. 5p., Oct. 26, 1971. 7 refs. (Appl. June 18, 1969, 8 claims).*

The sensible heat of sulfur dioxide-containing flue gas can be utilized to generate steam and to preheat methane or an equivalent hydrocarbon, the steam and hot methane being catalytically reformed to produce hydrogen. The hydrogen thus produced is employed to reduce the sulfur dioxide content of the flue gas to hydrogen sulfide, the hydrogen sulfide being reacted with a further quantity of sulfur dioxide to produce elemental sulfur which is recovered. (Author abstract modified)

19393 APTIC NO. 38410

Daessler, H. -G.

ABOUT PRESENT LEVEL OF EXHAUST DESULFURIZATION. *(Zum derzeitigen Stand der Abgasentschwefelung). Text in German. Soz. Forstwirtsch., 20(12):374-375, 1970. 4 refs.*

Different desulfurization equipment and problems of flue gas desulfurization are discussed. In the Kiyouratit and Monsanto processes, catalytic oxidation is followed by separation using ammonia and vapor, respectively. In the Mitsubishi process, the sulfur is removed in the form of manganic sulfate by means of filters. A mixture of sodium and aluminum oxides is used in the Alkalized--Alumina system. The alkaline Bischoff process guarantees an efficiency of 80%. The Sulfacid and Hitachi methods represent a transition from the dry to the wet process. Problems involved in low SO2 concentrations (0.2-0.4% by volume), large gas volumes, and high temperatures are common for all the above methods. There are no perfect and economical solutions available. Reduction in the atmospheric SO2 concentrations cannot be expected until after 1995. The use of additives to combustibles or in the combustion zone, of low-sulfur combustibles, or the desulfurization of fossil combustibles are some of the possibilities to be considered. Building high stacks should be regarded as a temporary solution only. Sulfur dioxide, emitted in an amount of 5.8 million tons in 1968, is the basic pollutant in East Germany.

19394 APTIC NO. 38209

Dalmon, J. and D. Tidy

THE COHESIVE PROPERTIES OF FLY ASH IN ELECTROSTATIC PRECIPITATION. *Atmos. Environ., 6(2):81-92, Feb. 1972. 8 refs.*

The cohesive properties and electrical resistivity of fly ash were measured and an attempt was made to relate them to the efficiency with which the ash is electrostatically precipitated. Cohesiveness was found to be of minor importance in the precipitation of a fine, highly resistive ash, while the resistivity was the most important factor. On the other hand, for a coarse, high carbon ash of low resistivity, a high cohesiveness was associated with a high collection efficiency and this was mainly due to an increased ability to capture the carbon fraction. The total cohesive force of an ash layer in an energized precipitator results partly from the electrical forces due to the electrical field and partly from a permanent component independent of the electrical field. The permanent component is the same for a layer precipitated electrically and for a mechanically formed layer. The electrical and permanent components are of approximately equal magnitude when the ash is highly resistive but the permanent component dominates when the ash resistivity is low. (Author abstract modified)

19395 APTIC NO. 37904

Davis, George B., Earle C. Makin, Jr., and Herbert J. Gebhart, Jr.

SELECTIVE COMPLEX FORMATION FOR THE REMOVAL AND RECOVERY OF CARBON MONOXIDE FROM MIXED GAS STREAMS. *(Monsanto Co., St. Louis, Mo.) U. S. Pat. 3,630, 676. 5p., Dec. 28, 1971. 2 refs. (Appl. Feb. 12, 1969, 10 claims).*

A process for the removal of carbon monoxide from mixed gas streams by selective complex formation is presented. Many industrial processes, e.g., ammonia synthesis and hydrofining contain CO in combination with hydrogen and light hydrocarbons. Such gases are used primarily for the hydrogen content, and the CO must be removed to prevent poisoning of the catalysts used. In other processes, the gases are used primarily for the CO content, thus necessitating the purification and recovery of CO from the gas stream. Prior techniques of selective diffusion, filtration, and induced reaction have not been too successful, particularly from the commercial standpoint. The present technique separates mixed gases containing CO and separates CO from mixed gases containing hydrogen by means of selective complex formation with greater selectivity for the CO. The mixed gases are contacted with a first complex containing a cuprous salt from the group comprised of cuprous fluoroborate and fluorophosphate together with a hydrocarbon from the group comprised of aromatics, olefins, and their mixtures. The CO is then separated and recovered from the resulting second complex phase.

19396 APTIC NO. 38239

Debus, Henri R., Rene L. Aga, and Earl R. Allen

DEAROMATIZATION UPGRADES STOCKS AT BRITISH REFINERY. *Oil Gas J., 69(38):95-98, Sept. 20, 1971. 4 refs. (Presented at the National Petroleum Refiners Association Annual Meeting, March 1971.)*

A catalytic hydrogenation process (Arofining) which converts aromatics in petroleum distillates to naphthenes is described. The process produces produces premium-grade kerosene, with a smoke point between 38-44 mm, and can also be used for producing low-aromatic solvents. The highly active catalyst used in the process promotes the complete removal or reduction of aromatics even in the presence of impurities such as sulfur and nitrogen compounds. Solvents containing less than 8 vol% aromatics with eight or more carbon atoms, as required by Rule 66 of the Los Angeles County Air Pollution Control District, are produced by one-stage treatment at 300 psig. When high conversion is desired with feedstocks containing more sulfur, pressures must increase. The process can also pretreat paraffinic feedstocks from isomerization processes, thus contributing to the transition to unlead gasoline. Processing costs for typical Arofining applications are shown, as well as the properties of typical products.

19397 APTIC NO. 37920

DeMaree, John S.

EXHAUST GAS WASHING APPARATUS. *(Assignee not given.) U. S. Pat. 3,621,652. 4p., Nov. 23, 1971. 17 refs. (Appl. July 2, 1970, 3 claims).*

An apparatus is described which is capable of removing at least a major portion of the contaminants in internal combustion engine exhaust gases which tend to promote air pollution. It includes means by which the exhaust gases will be successively lowered in temperature by passing through two heat exchange devices, thereby enabling a considerable portion of the water vapor to be condensed out of the exhaust gases. Water spray jets are utilized for cleansing the exhaust gases. An overriding control is provided whereby the associated internal combustion engine may not be started unless there is an ample supply of water in the supply system for the spray jets. The apparatus is economically feasible, long lasting, relatively trouble free in operation, and conforms to conventional methods of manufacturing.

19398 APTIC NO. 37776

Deschamps, Andre and Philippe Renault

PROCESS FOR REMOVING TRACES OF HYDROGEN SULFIDE CONTAINED IN GASES. *(Inst. Francais du Petrole, des Carburants et Lubrifiants, Paris (France)) U. S. Pat. 3,607,004. 3p., Sept. 21, 1971. 2 refs. (Appl. Oct. 21, 1968, 6 claims).*

Traces of hydrogen sulfide can be eliminated from contaminated gases by passing the gases through a liquid phase containing iodine dissolved in an organic solvent selected from the group consisting of sulfoxides, alkylene glycols, polyalkylene glycols, ethers of alkalene glycols and polyalkalene glycols, esters of alkylene glycols and polyalkalene glycols, and liquid aromatic hydrocarbons. The oxidation of H_2S by iodine can be carried out in a gas under a pressure of 0.1 and 10 kg/sq m, preferably between 20 and 40 C. (Author abstract modified) 0

19399 APTIC NO. 38620

Diamant, R. M. E.

THE PREVENTION OF POLLUTION. PART XII. *Heating and Ventilating Eng., 45(535):398-406, Feb. 1972. 9 refs.*

Control methods for sulfur dioxide removal from stack gases and the elimination of industrial air pollution are reviewed. Processes for SO_2 removal include additive injection techniques using limestone; dry methods of SO_2 absorption, e.g., alkalized alumina, vanadium pentoxide oxidation, and manganese dioxide methods; the molten carbonate process; catalytic oxidation; the still process; wet scrubbing; combustion engineering; the Lurgi method; and ammonia scrubbing. Operating procedures, efficiency, and costs are compared. Control methods for industrial processes include scrubbers, cyclones, improved firing methods, and electrostatic precipitators for coal and oil combustion appliances; particle removers for the dusts from mineral product industries; wet washers and exhaust ducts for metal containing dusts from metallurgical processes; water scrubbers, vents, exhaust systems, absorption towers, fabric filters, sodium hydroxide scrubbers, catalytic processes, cyclones, and electrostatic precipitators to control emissions from chemical processing plants, food operations, and fertilizer manufacturing; and scrubbing for oil refineries. Performance data, specific pollutant emissions, and efficiency are considered.

19400 APTIC NO. 38432

Dieker, E. V.

TWO YEARS EXPERIENCE IN HANDLING AND BURNING NO. 6 LOW SULFUR FUEL OIL. *Combustion, 43(7):34-36, Jan. 1972. (Presented at the American Society of Mechanical Engineers, Industrial Power Conference Philadelphia, Pa., June 7-8, 1971.)*

The results achieved by the conversion to low-sulfur oil at an average size steam-generating facility are described together with alterations in equipment handling. The low-sulfur oil (0.914) does not have poor lubricating properties or a lower viscosity and a lower heating value than high-sulfur oil. In addition to lower sulfur dioxide emissions, the amount of soot is noticeably less than with high-sulfur oil. Moreover, screens, burner tips, and furnace interior are cleaner, resulting in lower maintenance costs. The forecasted increased wear on the oil pumps has not been experienced.

19401 APTIC NO. 37841

Dixon, Paul F.

RECIRCULATING EXHAUST GAS SYSTEM FOR INTERNAL COMBUSTION ENGINES. *(Assignee not given.) U. S. Pat. 3,618,576. 3p., Nov. 9, 1971. 4 refs. (Appl. May 18, 1970, 5 claims).*

A recirculating exhaust gas system is described for internal combustion engines. It comprises a filter for solids, a condenser and cooler, a compressor, a secondary condenser, and a liquid container, all in a closed circuit connecting the exhaust outlet of an internal combustion engine with the air and fuel inlet. Solids and water are removed from the exhaust gas and the remaining gaseous products are condensed to a liquid and recycled to the engine along with new fuel and air supplies. (Author abstract modified)

19402 APTIC NO. 38451

Domina, Morislaw and Henryk Putnia

INDUSTRIAL TESTS ON WET SULFUR REMOVAL FROM COKE GAS. *(Przemyslowe proby mokrego odsiarczania gazu koksowniczego). Text in Polish. Gaz, Woda Tech. Sanit., (Warsaw), 46(1):29-32, Jan. 1972.*

A wet desulzurization procedure of coke gas using hydroquinone in alkaline solution as an organic oxygen carrier is described. Included are a sketch of the facility along with parametric temperature, flow rate, and yield studies. The yield of desulfurization depends mainly on the hydroquinone/alkali ratio and appears to be optimal at a 1.30/35 g/l proportion respectively. Hydroquinone should be added gradually, in very small amounts at a time, to prevent foam formation. Excess air should be avoided to preclude generation of a sulfurous foamy mass which would cause filtration difficulties. The necessity of an analytical method for determining the hydroquinone contents of the reacting system at any time during the process is emphasized. The procedure can be applied on an industrial scale.

19403 APTIC NO. 38639

Doornum, G. A. W. van, A. G. Bonapace, and H. T. Sorgnit

SMOKELESS COMBUSTION OF BITUMINOUS COAL IN DOMESTIC APPLIANCES. PART ONE. *Coal, Gold and Base Minerals of S. Africa, 19(10):35, 37, 39, 41-42, Dec. 1971.*

Problems involved in burning bituminous coal in small appliances smokelessly are reviewed. The theoretical aspects of the problem include the combustion process with regard to the chemical and physico-mechanical aspects. A feasibility study of the possibility of eliminating smoke production by providing an afterburner is discussed. Oxygen content of the flue gas, gas temperature, smoke density in the stack, and gas flow rate were monitored in a kitchen stove; liquified petroleum gas was used in the afterburner jet. Based on the experimental results, model combustion chambers with afterburners were tested. The Brultout model generated no smoke once the combustion chamber was hot; it is primarily intended for continuous operation.

19404 APTIC NO. 38476

Dreyhaupt, Franz Josef

COMBATING THE SO2 EMISSION ACCORDING TO THE STATE OF THE ART. *(Kampf der SO2-Emission nach dem Stand der Technik). Text in German. Umwelt (Duesseldorf), 2(1):36-39, Feb./March 1972. 15 refs.*

Sulfur dioxide contained in the atmosphere has a toxic affect on man, plants, and materials. Pines die in the Ruhr Valley because of the sulfur dioxide; its effect on these trees was probably enhanced by fluorine also present in the atmosphere. Plants begin to show signs of injuries at an annual average concentration of 85 micrograms SO2/cu m air. Materials begin to show serious signs of deterioration at an average annual SO2 concentration of 345 micrograms/cu m. Considerable physical effects on man have been observed at SO2 concentrations of more than 300 micrograms/cu m lasting for 3 or 4 days and of more than 115 micrograms/cu m air over the year. The existing maximum allowable emission concentration for SO2 (0.4 mg SO2/cu m air) in the Federal Republic of Germany is too high. Considerable plant injury at this concentration is not impossible. Unfortunately, the SO2 emission will continue to rise in future at least in the state of North Rhine Westphalia. Measures for reduction of the SO2 emission include the use of low-sulfur fuel oil (1% sulfur) and the desulfurization of the waste gases. Of the various desulfurization methods the Grillo-process is ready for practical use. It is estimated that this process used in oil-fired power plants will raise the power costs by 0.1 cents/kWh.

19405 APTIC NO. 38050

Ebeling, Robert W., Jr.

ADSORBER ELEMENT AND TEMPERATURE CONTROLLED ADSORBER PURIFICATION SYSTEM. *(Air Products and Chemicals, Inc., Allentown, Pa.) U. S. Pat. 3,626,671. 5p., Dec. 14, 1971. 2 refs. (Appl. May 2, 1969, 8 claims).*

A gas purification system is described wherin the adsorption bed comprises a plurality of adsorbent element disposed in a spaced relationship to one another, with channeling provided to conduct gas between the elements. Thermoelectric elements, in heat transmitting contact with each of the adsorbent elements, remove heat to cool the bed during the adsorption cycle and introduce heat during regeneration. External refrigeration and heating systems of the prior art added significantly to the weight and complexity of the adsorption unit. In addition, precise temperature control in such systems was extremely difficult due to the relatively high mass of the adsorbent and the attendant time delay in heating and cooling the adsorbent during each cycle. (Author abstract modified)

19406 APTIC NO. 38291

Eisfeld, Fritz

THE FILM VAPORIZATION COMBUSTOR AND ITS PHYSICAL FUNDAMENTS. PART II. THE REACTION CHAMBER AND THE COMBUSTION. *(Die Filmverdampfungsbrennkammer und ihre physikalischen Grundlagen. Teil 2: Die Reaktionskammer und die Verbrennung). Text in German. Motortech. Z. (Stuttgart), 33(1):8-15, Jan. 1972. 17 refs. Part I. Ibid., 31(2):47-51, Feb. 1970. 15 refs.*

The film vaporization combustor consists of an evaporator and a reaction chamber which is detached from the evaporator in order to achieve a good recirculation. Flow studies have revealed that a conical widening section after the evaporator also favors the recirculation. A much better and more homogeneous fuel and air mixture is achieved in the combustor than in the conventional engines with fuel injection. Through control of the wall temperature, any cracking process can be avoided. As a consequence, no soot develops. Operation is feasible with a very rich fuel/air ratio. Theoretically a ratio of lambda equals three could be achieved. In reality an experimental combustor was operated with a ratio of lambda equals 1.66. At such a rich fuel to air ratio no nitric oxide develops but a great deal of carbon monoxide does. The carbon monoxide, however, can be easily converted to carbon dioxide by afterburning. A comparison between the Maybach combustor and that by Holighaus revealed that the former has the optimum shape for a uniform and homogeneous combustion. The turbulence is achieved through tangential air inlet slots.

19407 APTIC NO. 38279

Elenkov, D. and G. Grozev

MATHEMATICAL DESCRIPTION OF THE SORPTION BEHAVIOR OF A XYLITE LOW-TEMPERATURE COKE TOWARDS SULFUR DIOXIDE. *(Mathematische Beschreibung des Sorptionsverhaltens eines Xylitschwelkokses gegenueber Schwefeldioxid). Text in German. Wasser Luft Betrieb, 16(3):92-95, March 1972. 11 refs.*

Sulfur dioxide sorption by xylite low-temperature coke was studied by orthogonal composition planning, using a model gas mixture of 0.22 to 0.78% by volume S02; 8% by volume 02; 5.4 to 15.0 g/cu m water vapor, and the remaining percentage of

N2. Xylite low temperature coke produced at 750 C was used with a grain size of 3 to 4 mm. A throughflow speed of 0.050 cu m/hr corresponding to a linear gas velocity of 0.0691 m/sec was used. The gas residence time was varied between 4.1 and 6.7 sec. The S02 concentration change in the waste gas was observed. From the obtained curves (initial S02 concentration vs., the changing S02 concentration as a function of time), the time necessary for reaching an adsorption efficiency of 90% was determined. The influence of the temperature, the S02 concentration, and the water vapor concentration in the gas mixture on the sorption process was determined by regression analysis. The gas residence time had the greatest influence, followed by the temperature. The water vapor concentration exerted the least influence. The obtained regression equations describe adequately the experimental data.

19408 APTIC NO. 38074

Ellison, John M.

A METHOD FOR GAS PURIFICATION FROM A SYSTEM RETORT. *(Vacuum Atmospheres Corp., North Hollywood Calif.) U. S. Pat. 3,593,495. 6p., July 20, 1971. 4 refs. (Appl. June 19, 1969, 4 claims).*

The operation of a gas purification retort unit is considered, wherein removal of a gas flow tube and getter carrier from a heated container are facilitated. The mode of operation of the tube and baffle structure are such that heat transfer from hot gas to a sealed interconnection between the container and a removable heat is blocked. Operation of the retort unit in a system for treating a gas containing oxygen, hydrogen and water is discussed. (Author abstract modified)

19409 APTIC NO. 37817

Erwin, Jimmy R., Edward Ray Lockhart, and Robert Lee Justice

FURNACE EXHAUST POLLUTION ELIMINATOR. *(Air Pollution Research and Developing Corp., West Ashland, Ky.) U. S. Pat. 3,605,386. 5p., Sept. 20, 1971. 11 refs. (Appl. June 16, 1970, 5 claims).*

A furnace exhaust pollution eliminator is described which can be adapted with a chimney stack in integral construction or to an installation between the input and exhaust ends of a stack. The eliminator includes plural baffles to confine the exhaust and ensure saturation of the exhaust solids, initially with steam and then with cold water to effect oxidation and reduction of certain of the solids and the ultimate condensation of the steam for drainage. It is also possible with this invention to substantially decrease the common vertical dimension of exhaust stacks serving foundries, iron and steel mills, and various reaction plants. (Author abstract modified)

19410 APTIC NO. 38045

Everroad, Hebert L.

AIR-FILTER-CLEANING APPARATUS. *(Assignee not given.) U. S. Pat. 3,620,234. 7p., Nov. 16, 1971. 4 refs. (Appl. July 7, 1969, 6 claims).*

An apparatus for cleaning air filters of the accordion folded-paper type is described. It comprises a housing having two compartments, one for circulating cleaning fluids from the inside to the outside of a filter, and the other from the outside to the inside. Filter-mounting fixtures are provided in the compartments for effecting the required circulation of fluids. Both air and water are circulated through the filters in both compartments. Selective controls are provided to enable either or both of the compartments to be used. (Author abstract modified)

19411 APTIC NO. 38119

Fein, Marvin Michael, Arthur Angelo Bellisio, and Hippocrates G. Psyras

PROCESS FOR THE REMOVAL AND/OR PREPARATION OF SULPHUR DIOXIDE FROM A MIXTURE OF MOIST OR OF DRY GASES. *(Verfahren zur Entfernung und/oder Gewinnung von Schwefeldioxid aus einem Gemisch von feuchten oder trockenen Gasen). Text in German. (GAF Corp., New York) W. Ger. Pat. 2,053,104. 15p., May 6, 1971. (Appl. Oct. 29, 1970, 9 claims).*

The method is designed to separate sulfur dioxide from combustion gases either in view of gas desulfurization or of reclaiming SO2 for further processing. This is accomplished by the absorption of the SO2 in an n-alkyllactam or cycloalkyllactam preferably in n-alkylpyrrolidone or n-alkylpiperidone with a one to six carbon atom alkyl group. These lactams of gamma and of delta-amino acids derived from butyric, valeric, and caprylic acid are neutral and act as physical absorbents. The absorbent which is water-soluble can be used on dry as well as on moist gases and can itself contain up to 20% water without impairing its absorptive power. The operation can be performed at ambient temperatures and atmospheric pressure in a countercurrent washing tower or similar installation. The SO2 which is quantitatively absorbed in the lactam is subsequently expelled in a column at 100-200 C by superheated steam. The crude gas has to be cooled before it is treated by this method, and suspended ash or other particulates have to be removed lest they contaminate the lactam. The reclaimed lactam is returned to the process.

19412 APTIC NO. 38464

Feldman, M. and F. R. Hore

A PLOW-DOWN METHOD FOR RAPID COVER OF LIQUID MANURE. *Can. Agr. Eng., 13(2):65-68, Dec. 1971. 2 refs.*

A rapid plow-cover method of spreading liquid manure from confined housing for animal production was devised in response to odor problems resulting from conventional methods. Simple hoods are fitted to the rear outlets of vacuum, liquid manure tankers to direct the slurry downward and spread it over a width of about 50-60 in. A second tractor with wheels set 60 in. apart and towing a 4-bottom, 16-inch moldboard plow follows immediately behind the tanker to plow down the manure. Inversion of the furrow slice completely buries the manure, resulting in little odor from the disposal operation. Three of four tankers may be used with one plow, resulting in a high-capacity system. Use of 3-inch tanker outlets, reduction of tanker pressure through reduced tractor pto speed, and operation at ground speeds of 4-5 mph resulted in reasonable application rates. (Author summary modified)

19413 APTIC NO. 38453

Feola, Massimo and Giuseppe Gabola

POLLUTANT EMISSIONS AND FUEL HOMOGENEITY IN CARBURETOR ENGINES OPERATING AT MINIMUM OR IDLING CONDITIONS. *(Emissioni di inquinanti ed uniformita della carica nei motori a carburazione funzionanti al minimo ed a vuoto). Text in Italian. Termotecnica (Milan), 26(1):28-40, 1972. 18 refs. (Presented at the Associazione Tecnica Italiana National Meeting, 25th, Trieste, Italy, Sept. 1970).*

Studies on a Fiat 600-D test i.c. engine with a conventional constant jet-type carburetor were performed under minimum and idling operating conditions to explore the related exhaust composition. Attention was focused on the angular position of the throttle and mixture valves which determines the amount of carbon monoxide and unburned hydrocarbon emissions. The testing unit included a thermostated oil and water cooling circuit along with the usual thermometric and manometric instrumentation. Diagrams illustrating the variations of the air-fuel ratio with the variations of the respective mixture (vertical axis) and throttle (horizontal axis) valve angles are reproduced. The angular position of the throttle affected the rotation speed to a larger extent than that of the mixture valve. Air flow depended on the rotating speed and fuel flow rates decreased with the increasing opening of the throttle. Air-fuel ratio varied according to a bell-shaped curve and depended on the air and fuel flow rates. Under constant throttle opening, carbon monoxide increased with the opening of the mixture admission valve and could reach 13% of the exhaust and the volumetric concentrations of unburned hydrocarbons could reach 2,500 ppm. Maximum carbon dioxide values corresponded to minimum CO values. The experimental data are not applicable quantitatively to the whole range of i.c. engines with the same carburetor type, but they emphasize the importance of the angular setup of the carburetor air register valves in the control of exhaust pollutants.

19414 APTIC NO. 37886

Finfer, Edward Z. and Michael H. Maurer

REMOVAL OF SULFUR OXIDES FROM WASTE GASES. *(Chemical Construction Corp., New York) U. S. Pat. 3,607,001. 6p., Sept. 21, 1971. 3 refs. (Appl. Dec. 26, 1967, 12 claims).*

Sulfur oxides are removed and recovered from waste gas streams by scrubbing the gas stream with an aqueous alkali solution. The solution absorbs the sulfur oxides which react with alkali to form alkali sulfite and sulfate in solution. The resulting solution is cooled to precipitate solid alkali sulfite and sulfate, which are separated from the residual solution and dissolved in an aqueous anolyte solution containing sulfuric acid and alkali sulfate. The alkali sulfite reacts with the sulfuric acid to form further alkali sulfate in solution and liberates a concentrated sulfur dioxide gas stream, which is withdrawn as a product of the process. The aqueous alkali sulfate solution is electrolyzed in a mercury cathode electrolytic cell, to produce a mercury-alkali metal amalgam at the cathode which is withdrawn and reacted with water to produce product hydrogen gas, aqueous alkali hydroxide solution, and regenerated mercury. The aqueous alkali hydroxide solution is added to the residual solution from alkali-sulfite-sulfate precipitation, and the combined solution is recycled for futher gas scrubbing. The anode of the cell produces product oxygen gas and an aqueous sulfuric acid-alkali sulfate anolyte solution, which may be processed to remove excess sulfuric acid. The anolyte solution is then employed to produce gaseous sulfur dioxide. (Author abstract)

19415 APTIC NO. 37775

Force, Robert C. La

AIR POLLUTION SYSTEM TEMPERATURE CONTROL. *(Assignee not given.) U. S. Pat. 3,606,753. 6p., Sept. 21, 1971. 3 refs. (Appl. Sept. 8, 1969, 10 claims).*

A method and apparatus are presented for maintaining the temperature of hot gases being exhausted from an internal combustion engine within a controlled range for assuring a maximized thermal reacting of hydrocarbons and carbon monoxide with a minimized production of nitrogen oxides before discharge into the atmosphere. The temperature control system employs fluid-jacketing of an exhaust manifold with a valve system operatively connected between the jacketing and an intake manifold. It is the object of this system to supply air to the jacketing to reduce the temperature of the exhaust gases when the engine is operating under full or heavy load and to withdraw air and provide a maximum insulating effect when the engine is operating under a low load or is idling. (Author abstract modified)

19416 APTIC NO. 37887

Franco, Alvaro

MEXICAN PROCESS PROMISES POLLUTION CONTROL. *Oil Gas J., 69(16):174-175, April 19, 1971.*

Developed by Bufete Industrial, S.A., the Marino process can charge any sulfur dioxide stream and convert it to ammonium sulfate. The only feedstock required is readily available anhydrous ammonia which is reacted in a molar ratio of 1/2 with heated SO2. The SO2 is absorbed and converted to ammonium sulfite. Washed and dried ammonium sulfite crystals are then passed to a fluidized-bed reactor where they are oxidized to ammonium sulfate. The new Mexican process requires a relatively low capital investment.

19417 APTIC NO. 38545

Frielink, J. G.

TREATMENT OF GASES DERIVED FROM COMBUSTION OF SULFUR-CONTAINING FUELS. *(Werkwijze voor het verminderen van de luchtverontreiniging, die veroorzaakt wordt door de verbranding van een zwavelhoudende brandstof). Text in Dutch. (Combustion Engineering, Inc., Windsor, Conn.) Dutch Pat. 6,919,657. 15p., July 2, 1970. (Appl. Dec. 31, 1969, 11 claims).*

The steps in this treatment of gases derived from the combustion of sulfur-containing fuels comprise: adding a soluble calcium salt to the washing water to react with the dissolved magnesium sulfate to form insoluble calcium sulfate and a solution of the corresponding salt; separating at least a part of the solution from the precipitated calcium sulfate; reacting the separated part with calcium hydroxide so that its magnesium content is precipitated in the form of magnesium hydroxide; separating the magnesium hydroxide from the solution of the calcium salt; and recirculating the solution of the calcium salt to the washing stage. The soluble calcium salt is preferably calcium chloride. The process enables the magnesium content of the washing solution to be recovered for reuse.

19418 APTIC NO. 38235

Frost, H. J.

ELIMINATION OF WASTE PRODUCTS BY INCINERATION. *(Entsorgung durch Verbrennung). Text in German. Preprint. Badische Anilin- and Soda-Fabrik A. G., Ludwigshafen (West Germany), 5p., June 24, 1971.*

In the chemical industry, waste products are mostly removed by incineration where emissions must be combatted. Waste gas with low fuel concentration (below the lower explosion point) can be catalytically or thermally afterburned. Catalytic afterburning takes place on oxide or precious metal catalysts both of which are soon contaminated and become ineffective. Thermal afterburning takes place at higher temperatures. Auxiliary fuel is used to achieve higher temperatures. For combustion of odorous substances, muffle furnaces are used. Incineration plants for substances which cause considerable pollutant emission can be operated only in connection with absorption plants. For incinerating chlorine-containing byproducts in vinylchloride and propylene oxide manufacture as well as other halogenated hydrocarbons, several methods have been developed (Uhde, UCC, Yawata, and Oxychlo5ration) where hydrochloric acid, hydrogen chloride, and chlorine are obtained. A special burner construction is necessary to guarantee soot-free combustion. The combustion of sulfite waste lyes from the cellulose industry has been successfully solved. The magnesium oxide is separated by means of cyclones. As aqueous solution, it is then used for the desulfurization of waste gases. As much as 100,000 cu m gas/hr may leave the stacks of refineries in case of faults or also at the beginning or the end of an operation. These gases must be burned in a flare. It is of importance that such flares have a reliable ignition system.

19419 APTIC NO. 37997

Frymann, H. K.

INSTALLATION OF PREHEATERS ON THREE EXISTING ROTARY KILNS. *(Einbau von Rohmehl-Vorwaermern bei der Umstellung von drei aelteren Drehoefen). Text in German. Zement-Kalk-Gips (Wiesbaden), 60(12):554-555, Dec. 1971. (Presented at the VDZ-Kongress 71 Verfahrenstechnik der Zementherstellung, Dusseldorf, West Germany, Sept. 28-Oct. 1, 1971.)*

In order to fulfill the stringent requirements concerning dust emission, a cement factory in Maryneal Texas installed 4-stage heat exchangers and glass fiber filters. Extensive studies preceded the installation. Since water is scarce in this part of Texas, the idea of water injection into the gases which leave the kiln at 700 C had to be abandoned. Addition of fresh air would have tripled the cold gas volume. The power consumption would have increased enormously. The utilization of waste heat in heat exchangers with glass fiber filters reduced the heat consumption by one-third and permitted an increase of the capacity by 25%. Operation of the individual kilns had to be halted for 33 to 37 days; the construction began in March 1970 and lasted until June 1971. Satisfactory results have been obtained to date.

19420 APTIC NO. 38257

Gately, Thomas J., Bartholomew F. Quintilian, and Charles H. Rodgers

PNEUMATIC RAPPER FOR ELECTROSTATIC PRECIPITATORS. *(Koppers Co., Inc., Monroeville, Pa.) U. S. Pat. 3,605,915. 8p., Sept. 20, 1971. 4 refs. (Appl. April 11, 1969, 13 claims).*

A pneumatic, single-impulse rapper for electrostatic precipitators is described which comprises a piston made from dry lubricating material within a unitary, flangeless, cylindrical housing having no bolted connections. The piston returns to its pre-pulse position by a spring having reduced diameter end coils, and it includes a spherical or alternate striking surface for localized impact against the end of the housing. The housing includes a non-removable cap and an air inlet adapted to secure a strengthened air fitting to the housing. A braided wire provides electrical grounding of the rapper. (Author abstract modified)

19421 APTIC NO. 38102

Giles, Roger F.

METHOD OF REMOVING POLLUTANTS FROM INDUSTRIAL EXHAUST PRODUCTS. *(Simpson Timber Co., Seattle, Wash.) U. S. Pat. 3,624,985. 3p., Dec. 7, 1971. 4 refs. (Appl. Oct. 15, 1969, 3 claims).*

The design for a modified venturi scrubber to remove pollutants from industrial exhaust products is presented. Prior venturi systems operated efficiently only on the range of pollutants which were present at the time they were designed; a major change in the constituency of the exhaust products, therefore, caused the systems to operate inefficiently. The modified system may be adjusted or tuned to operate at peak efficiency and with the lowest possible pressure drop in the discharge line regardless of the particle size of the exhaust. The particles are accelerated through a scrubbing liquid in the scrubber. The system has a replaceable throat section to be changed according to the sizes of the particles.

19422 APTIC NO. 38054

Grainger, Lewis M. D.

ANTIPOLLUTION SYSTEM FOR INTERNAL COMBUSTION ENGINES. *(Assignee not given.) U S. Pat. 3,630,032. 5p., Dec. 28, 1971. 5 refs. (Appl. Sept. 4, 1970, 6 claims).*

A system is described for attachment to an internal combustion engine to supply air to the exhaust stream and consume the air pollutants in the combustion chamber. An air injector is positioned in the exhaust stream, and the exhaust gases are fed through the air injector and combustion unit which is heated by the exhaust gases. The exhaust gases remain at a relatively high temperature while the engine is operating to complete the burning of all air polluting materials contained in the exhaust gases. The air is forced-fed by any desired blower and optionally includes air extracted from the crankcase in engines so equipped. The air may be preheated by contact with the exhaust manifold and may be entrained with the exhaust gases before reaching the combustion chamber unit. (Author abstract modified)

19423 APTIC' NO. 38055

Grainger, Lewis M. D.

ANTIPOLLUTION SYSTEM FOR INTERNAL COMBUSTION ENGINES. *(Assignee not given.) U. S. Pat. 3,630,031. 5p., Dec. 28, 1971. 5 refs. (Appl. April 10, 1970, 6 claims).*

The elimination of air pollutant materials from an internal combustion engine exhaust stream can be accomplished by supplying additional air to the exhaust gas and completely burning the pollutants prior to admission to the atmosphere. An air injector is positioned in the exhaust stream to provide the necessary oxygen to burn the pollutants. The exhaust gases are fed through an air injector and combustion chamber unit which is heated by the exhaust gases and remains at a relatively high temperature while the engine is operating to complete the burning of all air polluting materials. The air is force-fed by any desired blower and optionally includes air extracted from the crankcase in engines so equipped. (Author abstract modified)

19424 APTIC NO. 38122

Grainger, Lewis M. D.

ANTIPOLLUTION SYSTEM FOR INTERNAL COMBUSTION ENGINES. *(Assignee not given.) U. S. Pat. 3,630,182. 6p., Dec. 28, 1971. 11 refs. (Appl. June 17, 1970, 5 claims).*

An automotive emission control system for internal combustion engines is described in which a blower-forming part of the fan blade of the engine draws fumes from the crankcase and feeds the fumes along with fresh air through a heat exchanger to heat the gases and then to an oil bath air cleaner attached to the air intake of the carburetor. A portion of the fumes are fed to an exhaust gas pollution burning device. Thus, fumes from the crankcase will be completely eliminated and air will be supplied to the oil bath air cleaner in sufficient quantity so that the engine is supercharged. (Author abstract modified)

19425 APTIC NO. 38311

Grieve, George Price

INDUSTRIAL HEATING APPARATUS WITH AIR-POLLUTION CONTROL. *(Assignee not given.) U. S. Pat. 3,627,290. 8p., Dec. 14, 1971. 2 refs. (Appl. July 23, 1970, 12 claims).*

A modified design for an industrial oven for drying, baking, and curing operations which converts polluting components into harmless exhaust materials is presented. The standard process for the removal of pollutants from such sources is incineration by high-temperature flames, most commonly fed by natural gas. The capital cost for the initial installation and the cost of the gas, however, are extremely high. Within the modified design, the stream of hot gas and air exhausted from the oven is diverted through an incinerator where the pollutants are converted to harmless water and carbon dioxide vapors. Some of the hot purified gas effluent from the incinerator is then directed back to the oven via an arrangement of dampers at a flow rate sufficient to maintain the oven at a predetermined temperature. The dampers exhaust excess hot gas to the atmosphere and draw in an equivalent volume of fresh makeup air. The temperature in the oven is controlled by automatic dampers which balance the proportion of cool air and hot incinerator effluent. (Author abstract modified)

19426 APTIC NO. 38596

Grimm, Werner

FUEL OIL AND EMISSION PROTECTION. *(Heizoel und Immissionsschutz). Text in German. Tech. Ueberwach. (Duesseldorf), 13(3):57-65, March 1972. 20 refs.*

Fuel oil assumes a dominating role during combustion processes in industries and also for domestic heating. During the combustion of fuel oil, combustion products of sulfur, mostly sulfur dioxide, are emitted. Despite a steadily increasing power demand within the period 1960 to 1980, a clearly decreasing tendency of SO2 emission can be observed. This is mainly due to the replacement of hard coal whose sulfur content cannot be influenced by any means with fuel oils. The sulfur content in fuel oil is either reduced by desulfurization in the refineries (e.g., fuel oil EL, a pure distillation product) or by using low-sulfur crude oils. Desulfurization of fuel oil S (composed of distillation residues) is too costly. For the reduction of SO2 in waste gases, wet and dry methods are available. The Grillo AGS method is based on the principle of wet absorption without cooling the waste gases too much. For an oil-fired power plant with a capacity of 640 MW, the investment costs for desulfurization by the Grillo method are estimated to come to 2,800,000 dollars for a 90% reduction of the SO2 concentration from 0.12% by vol to 0.012% by vol. With an operating time of 6000 hr/yr, the operating costs are estimated to amount to .041 cents/kWh. The costs for regeneration of the absorption agent are between 0.007 and 0.05 cents/kWh. For the Shell process, which is a desulfurization process based on dry absorption, the operating costs at 8000 operating hr/yr of a 30 MW plant amount to 0.0004 cents/kwh, the investment costs to 240,000 dollars. The domestic oil-fired heating systems, an optimum fuel/air ratio must be maintained for reducing the SO2 emissions.

19427 APTIC NO. 38007

Gronholz, Donald D. and Delmer L. Radeztsky

AIR FILTER GASKET ELEMENT. *(Donaldson Co., Inc., Minneapolis, Minn.) U. S. Pat. 3,616,618. 5p., Nov. 2, 1971. 9 refs. (Appl. Aug. 13, 1969, 14 claims).*

An improved centrifugal air filter is described which consists of a resilient gasket casing that fits over and encircles part of the air filter assembly. The resilient gasket casing not only facilitates simple removal of the air filter assembly for maintenance and inspection, but part of the casing forms a seal which prevents air from entering the cleaner between the outer container and the air filter assembly. Another portion of the gasket casing forms a cushion to dampen vibration. A radially disposed head or flange portion provides a stop which indicates when the gasket casing is in proper position, while a portion of the casing extends inward from the seal to create an air impervious baffle that prevents dust and other impure particles from entering the air filter.

19428 APTIC NO. 38284

Guehne, Hanspeter

DEMANDS ON AIR FILTERS OF DIESEL ENGINES OF HEAVY TRUCKS. *(Anforderungen an die Luftfilteranlage von Dieselmotoren schwerer Lastkraftwagen). Text in German. Automobiltech. Z. (Stuttgart), 74(3):117-123, March 1972. 6 refs.*

Air filters for diesel engines in heavy trucks must be capable of retaining waste gas soot and dust particles. The development of exhaust gas soot cannot be prevented, particularly during full load operation. A truck with 220 HP and a still permissible exhaust gas soot number of 4 produces 500 g soot over a distance of 250 km. Soot is amorphous carbon with particle sizes of 0.01 to 0.2 micron. Furthermore, exhaust gas soot contains oil mists with a particle size between 0.03 and 1 micron. Soot particles tend to agglomerate to grains of more than 70 micron. They are rather unstable and break apart easily. The dust which trucks draw in is smaller than 20 micron. The concentration on paved streets or highways is low and lies between 0.2 and 0.6 mg/cu m. Good collection efficiencies for these particulates were obtained with a new dry filter. It is a single-stage filter with maximum paper surface and low intake resistance. A filter paper which is much thinner than the one presently used, at the same filtering and strength properties, provides the required large collection surface. The depths of the folds is 125 mm.

19429 APTIC NO. 37927

Gustavsson, Karl-Axel Goran

APPARATUS FOR CLEANSING FLUE GASES. *(Aktiebolaget Bahco, Stockholm (Sweden)) U. S. Pat. 3,608,281. 5p., Sept. 28, 1971. 9 refs. (Appl. June 19, 1970, 6 claims).*

An apparatus is presented for cleansing flue gases of different impurities, primarily sulfur dioxide and secondarily the solid products of combustion. The apparatus comprises a container for the treatment liquid and a gas inlet arranged so that the gas flows substantially at right angles to the surface of the liquid. A treatment passage extends vertically upwards from the liquid surface in the container, so that the gas after contact with the liquid flows through linearly entraining droplets of liquid. The container communicates below the liquid level with an equalizing tank having means for introducing an alkali and fresh water. The equalizing tank also has means to maintain the liquid at a level which adjusts automatically to variations in the rate of gas supplied. (Author abstract modified)

19430 APTIC NO. 38228

Gwyn, John Edward, Lisle Leo Baldwin, and Howard Houston Brodhead

METHOD AND EQUIPMENT FOR THE FAST COOLING OF THE GAS STREAM FROM HYDROCARBON PYROLYSIS. *(Verfahren zum raschen Abkuehlen des gasfoermigen Abstroms einer Kohlenwasserstoff-Pyrolyseanlage und Vorrichtung zur Durchfuehrung dieses Verfahrens). Text in German. (Shell Internationale Research Maatschappij N. V., The Hague (Netherlands)) W. Ger. Pat. 2,062,937. 27p., June 24, 1971. (Appl. Dec. 21, 1970, 11 claims).*

To prevent undesirable tar and coke formation from the highly unsaturated and unstable gaseous products of hydrocarbon pyrolysis, the gas flow can be cooled from 700 to 370 C, thus securing a relative degree of stability of the olefins and the other unsaturated gases. Cooling is accomplished by the heat storing capacity of heat-resistant heavy gas oil used as the cooling liquid and by its evaporation heat. The heavy gas oil is separated from the gas stream by fractionation following cooling and is mixed with the bottom fraction from this operation and returned to the process. The cooling liquid is fed radially into a cooling cylinder where it forms a continuous film on the inner walls. The temperature in the cooling zone is below the dew point of the gas stream and compatible with the stability of its components. The cooling liquid is introduced into the cylinder through its walls, in a direction other than the upward vertical flow of the gas stream. The ratio between the kinetic energy of the cooling liquid in a direction perpendicular to the longitudinal axis of the cooling zone and kinetic energy of the gas stream is, at most, one to one and preferably one half to one.

19431 APTIC NO. 38308

Haas, L. A. and S. E. Khalafalla

REMOVING SULFUR DIOXIDE BY CARBON MONOXIDE REDUCTION. *Instr. Control Systems, 45(3):101-104, March 1972. 12 refs.*

Sulfur dioxide in waste gases can be reduced by carbon monoxide in a reaction catalyzed by a mixture of iron and alumina. CO will be present in a stack if combustion is operated on a slightly rich fuel-to-air ratio. The design of systems for effective SO2 removal requires kinetic data, which indicate the influence of various parameters on the catalytic reduction. To obtain this information, the SO2 reduction was studied using an apparatus which permitted chemically pure gases to be premixed through capillary flowmeters. Catalyst preparation, reaction rate, catalyst composition, temperature, pellet size, and partial pressure are discussed. A synergistic effect was observed with mixtures of iron and alumina, in that the combined catalytic activity far exceeded the sum of the individual contributions. The pressure drop through the reactor varied approximately as the minus 1.5 power of catalyst diameter.

19432 APTIC NO. 38097

Hamblin, Robert J. J.

REMOVAL AND RECOVERY OF SULFUR FROM A GAS STREAM CONTAINING H2S. *(Universal Oil Products Co., Des Plaines, Ill.) U. S. Pat. 3,594,125. 7p., July 20, 1971. 5 refs. (Appl. Feb. 26, 1969, 10 claims).*

A process is described for removing hydrogen sulfide from a gas stream by sequentially scrubbing the gas stream with an ammoniacal water stream and with an ammonia-free water stream. A treated gas stream which is reduced in H2S content and substantially free of NH3 is produced, as well as a bottom water stream containing ammonium hydrosulfide and ammonium hydroxide. The bottom water stream is catalytically treated with an air stream to produce an effluent stream containing ammonium polysulfide. The ammonium polysulfide stream is treated to recover sulfur and produce one water stream which is free from NH4OH and one which contains NH4OH. At least a portion of these two streams is separately recycled to scrubbing step. (Author abstract modified)

19433 APTIC NO. 37980

Hardt, Robert C.

SOLIDIFIED GAS FILTER. *(Chemetron Corp., Chicago, Ill.) U. S. Pat. 3,618,330. 4p., Nov. 9, 1971. 7 refs. (Appl. Sept. 12, 1968, 5 claims).*

Nowhere in the prior art is there provided a method or apparatus for advantageously employing the same substance in a compacted state to serve as a filter for the same substance in a gaseous state. Neither is there available a filter for solidified gaseous materials wherein the size of the filter and the pressure drop across it are regulated without substantial deviation. An apparatus and method for filtering solid gaseous particles from a gas stream are described, wherein a liquefied gas such as liquid carbon dioxide is flashed into a closed chamber to form gas and a particulate snow-like material. Some of the solid material is subsequently employed as a porous filter for the gas to separate the solid matter. The amount of material employed as a filter is regulated to provide a constant pressure drop for the gas across the filter. The particulate solidified gaseous material after being filtered is subsequently compressed into pellets. (Author abstract modified)

19434 APTIC NO. 38697

Harkness, A. C. and F. E. Murray

OXIDATION OF METHYL MERCAPTAN WITH MOLECULAR OXYGEN IN AQUEOUS SOLUTION. *Atmos. Environ., 4(4):417-424, July 1970. 6 refs.*

Oxidation rates, reaction mechanisms, and catalytic activity involved in the oxidation of methyl mercaptan with molecular oxygen in an aqueous solution were investigated to provide data on which to base control methods for air pollution by kraft pulp mills. Methyl mercaptan was readily oxidized in an alkaline solution in the presence of metal ion catalysts. Oxidation rates in the absence of catalytic materials were extremely slow. The products of oxidation at 30 C in a strongly alkaline solution were dimethyl disulfide and hydrogen peroxide. The chemical reactions were first order with respect to both oxygen and mercaptan concentration, although the oxidation proceeded mostly in the intermediate regime between kinetic and diffusion control. The order of decreasing catalytic activity among the metal salts studied was cobalt chloride, copper sulfate, nickel formate, ferric sulfate, zinc sulfate, and silver nitrate. (Author conclusions modified)

19435 APTIC NO. 37875

Hass, Robert H. and Rowland C. Hansford

METHOD OF PURIFYING AUTOMOTIVE EXHAUST GASES. *(Union Oil Co. of California, Los Angeles) U. S. Pat. 3,619,127. 3p., Nov. 9, 1971. 9 refs. (Appl. Sept. 22, 1966, 4 claims).*

A catalyst is provided that is capable of efficient oxidation of hydrocarbons at low temperatures, as well as at temperatures above about 600 F, thereby providing a short warmup period and the removal of atmospheric pollutants soon after engine startup. This may be accomplished by the addition of a small amount of platinum metal catalyst to a group VI metal oxide catalyst for the purpose of triggering the combustion of carbon monoxide at low temperatures, which in turn will rapidly warm up the Group VI metal oxide to a temperature at which it will be effective for the combustion of hydrocarbons.

19436 APTIC NO. 38112

Hatano, H.

THE BEHAVIOR OF SULPHUR IN THE SUSPENSION PREHEATER KILN SYSTEM. *(Ueber das Verhalten des Schwefels im Waermetauscherofen). Text in German. Zement-Kalk-Gips (Wiesbaden), 25(1):18-19, Jan. 1972. 3 refs. (Presented at the VDZ-Kongress, Verfahrenstechnik der Zementherstellung, Duesseldorf, West Germany, Sept. 28-Oct. 1, 1971.)*

In general, the exit gases from a cement kiln do not contain an excessive amount of sulfur dioxide. In kilns with suspension preheaters, the contact between the gas and the solids is much more intensive than in other kilns, so a much higher degree of SO2 absorption in achieved. When the gas from the preheater is utilized in the raw mill or dryer, there is almost total absorption of the SO2 in the gas by the raw material. The sulfur balance in the material and in the exhaust gas in suspension preheater kilns was studied. The gas from the preheater contains about 300 mg of SO2/N cu m (0.01%), while the gas from the mills and dryer contain hardly any SO2. The absorption mechanism where the raw materials absorb SO2 at temperatures below 300 C was investigated in the laboratory. Small samples of limestone or other raw materials were suspended in a reaction tube by a gas flow containing 0.98% SO2, 5.23% oxygen, 10.6% carbon dioxide, and nitrogen. The gas mixture was diluted with air and heated to the desired temperature. The gas volume passed through the tube was 10 l/min. The quantity of SO2 absorbed by the limestone was 0.49% at 270 C, 0.25% at 200 C, and 15% at 100 C. This confirms that the SO2 absorption is continued at temperatures below 300 C, although the reaction speed drops with decreasing temperature. Moist gas is absorbed somewhat better than dry gas. The SO2 retention per surface unit of the powder of the suspended material was the same in all experiments.

19437 APTIC NO. 37990

Hays, George E. and Melvin A. Albright

LOW-TEMPERATURE PURIFICATION OF FLUIDS. *(Phillips Petroleum Co., Bartlesville, Okla.) U. S. Pat. 3,616,602. 3p., Nov. 2, 1971. 2 refs. (Appl. Jan. 29, 1970, 10 claims).*

An adsorption method of purifying liquid or gas streams is presented which employs a temperature at or below the freezing point of the constituents to be adsorptively removed from the stream. Operating at or below the freezing point greatly increases the adsorption capacity of the adsorptive material. Conventional methods of purification of a helium-containing natural gas include a caustic or ethanolamine extraction for removal of carbon dioxide, followed by cooling to about minus 185 C at suitable elevated pressure for separation of nitrogen, and succeeded by further cooling and separation to obtain 98% pure helium product. However, such impurities are insufficient for many modern applications, and one approach has been to use charcoal or activated carbon or other adsorptive material in an adsorption contacting process. The present method overcomes the serious limitations of the previous methods due to the exceedingly low adsorptive capacities of the adsorptive materials. This process is also applicable to removal of impurities from a methane stream or the purification of air by the removal of pollutants. (Author abstract modified)

19438 APTIC NO. 38210

Heaney, J. P. and L. Doughty

OPTIMAL ATMOSPHERIC EMISSION CONTROL IN THE WOOD PULP INDUSTRY. *Atmos. Environ., 6(2):93-102, Feb. 1972. 10 refs.*

A mathematical programming model was formulated to determine the optimal atmospheric emission control alternatives for the pulp industry. Generalized multi-path programs were developed showing the emission sources, the unit emissions from these sources, and the available control alternatives. Using these diagrams it is possible to depict a given mill by selecting the appropriate flow paths. Formulation of the optimization model as a mixed integer-linear programming problem is presented. Then the results of a sample analysis using the model are described. A procedure is presented for determining the net cost of particulate emission standards as well as a sensitivity analysis of the impact on the optimal solution of varying the value of recovered chemicals. (Author abstract)

19439 APTIC NO. 37840

Henry, Joseph W. and Edward S. Loane

REMOVAL OF SULFUR DIOXIDE FROM BOILER FLUE GASES. *(Pennsylvania Electric Co., Johnstown, Pa.) U. S. Pat. 3,607,034. 13p., Sept. 21, 1971. 9 refs. (Appl. April 5, 1967, 1 claim).*

Am improved technique and apparatus are provided for the conversion of the very minor amounts of sulfur dioxide in boiler flue gas to sulfur trioxide and the eventual recovery of the sulfur trioxide as sulfuric acid. After cooling and removal of solid ash constituents, the sulfur dioxide-containing flue gases are subjected to catalytic oxidation. By passing the sulfur dioxide containing flue gases in an indirect countercurrent heat exchange relationship with the sulfur trioxide-containing gases issuing from the catalytic oxidation operation, the sulfur dioxide-containing gases are brought up to a temperature of 750 F. The sulfur trioxide-containing gases are subjected to a further reduction in temperature to convert the sulfur trioxide to sulfuric acid by reaction with the water vapor present in the flue gas. (Author abstract modified)

19440 APTIC NO. 38113

Herchenbach, H.

DUST CYCLES: INFLUENCES IN THE AIR-SUSPENSION PREHEATER UPON COATING, PRECALCINING AND PARTIAL GAS EXTRACTION. *(Staubkreislaeufe - Einfluesse im Schwebegas-Waermetauscher auf Ansatz, Vorentsaeuerung und Teilgasabzug). Text in German. Zement-Kalk-Gips (Wiesbaden), 25(1):13-14, Jan. 1972. 3 refs. (Presented at the VDZ-Kongress, Verfahrenstechnik der Zementherstellung, Duesseldorf, West Germany, Sept. 28-Oct. 1, 1971.)*

In Humboldt preheater installations operating normally, dust quantities returned to the kiln were less than 150 g/cu m. Where higher values were found, a dust cycle between the inlet chamber and the bottom cyclone stage existed. The cause for this was due to a higher quantity of alkaline compounds in the waste gases and/or a higher concentration of gaseous sulfur oxides. The presence of these compounds in higher quantities causes the formation of calcium sulfates or calcium sulfate silicates. Upon impaction of the hot dust-laden gases on the relatively cool furnace lining of the entrance chamber, incrustations may develop which cause a dust cycle. The incrustations can be reduced by control of the dust cycle. Partial extraction of the waste gas is practiced nowadays only when a clogging of the cyclone is unavoidable. For large plants the installation of a bypass for extraction of 2 to 3% of the waste gas is of a greater advantage and a more economical method of reducing the incrustations than a controlled dust cycle. The quantity of dust returned to the kiln depends on the condition of the raw meal, on the cross-sectional loading (kcal/sq m hr), and thus on the gas velocity in the kiln as well as on the revolution speed of the kiln.

19441 APTIC NO. 38274

Hilfman, Lee

DESULFURIZATION PROCESS AND CATALYST. *(Universal Oil Products Co., Des Plaines, Ill.) U. S. Pat. 3,617,527. 5p., Nov. 2, 1971. 4 refs. (Appl. Oct. 16, 1969, 6 claims).*

A desulfurization catalyst is described which comprises alumina- containing carrier material, a nickel component, and a tin component. Nickel constitutes from 1.0 to 10.0% by weight of the composite and tin from about 0.7 to 7.0%. The catalyst preferably also contains from 4.0 to 30.0% by weight of a Group VI-B metal component. The catalyst is prepared in a manner which inhibits the formation of nickel aluminate. This method can be used to desulfurize hydrocarbonaceous material, especially heavier materials such as black oil.

19442 APTIC NO. 38296

Hindin, Saul G. and Joseph C. Dettling

CATALYSTS FOR PURIFICATION OF WASTE GASES CONTAINING OXIDES OF NITROGEN. *(Engelhard Minerals and Chemicals Corp., Newark, N. J.) U. S. Pat. 3,615,166. 5p., Oct. 26, 1971. 4 refs. (Appl. June 16, 1969, 12 claims).*

A method for the preparation of improved catalysts for the purification of waste gases containing nitrogen oxides, e.g., from the manufacture of nitric acid by ammonia oxidation, is presented. Previous processes for the catalytic purification of waste gases have not been entirely successful; one of the main problems was that the catalysts were too easily deactivated, and were thus less effective for the removal of NOx. The catalysts for the present technique are comprised of a core of an inert refractory material having a particle size of 0.01-10 micron, a coating of thermally stable thoria or zirconia substantially covering the core material, and a catalytic metal deposited on each coating. The thoria or zirconia has a surface area of at least 50 sq m/g after calcination at 1000 C for 4 hrs. X-ray diffraction patterns of the thoria or zirconia coated core material show essentially only the coating. The catalysts are highly effective for NOx removal and have exceptionally high stability. (Author summary modified)

19443 APTIC NO. 38115

Hisatsune, Takeo

DUST COLLECTION OF HIGH TEMPERATURE GASES BY WET-TYPE AND BAG FILTER COLLECTORS. *(Shisshiki oyobi baggu firuta ni yoru koon gasu no shujin). Text in Japanese. Nenryo Oyobi Nensho (Fuel and Combustion), 39(1):40-46, Jan. 1972.*

The collection of dusts from high temperature exhaust gases is problematical due to the corrosive nature of gases, high temperature, and the high cost of operation and maintenance of the systems. The previously, widely used wet dust collectors had only 70 to 80% collection efficiency, and damages to fans, caused by accumulation of dust, were quite frequent. More recently, the wet dust collector has been exclusively used for high temperature gas fume collection in foundry cupolas. The principle, mechanism, and effect of the venturi scrubber are explained. A venturi rod hydrofilter is discussed with illustrations. This is a relatively simple structure consisting of a number of wet pipes over which the high temperature gas fume is passed. Vapor is created on the surface of the pipes and mingles with the high speed gas current, colliding into dust particles and collecting them. Bag filters are most frequently used for dust collection of high temperature gases. Different filters are used according to the type of gas; problem gases are steam, sulfur dioxide, carbon monoxide, chlorine gas, and fluoride gas. Various types of corrosion and cooling methods are discussed. One type of dust tube collector is discussed with illustrations. The gas enters from the hopper and coarse dusts collide into a baffling board and settles. The gas current enters the filter bag and the cleaned air goes out from the top. The dust accumulation on the filter fabric is periodically shaken off by the horizontal movement of shaker pipes and the vertical movement of the bags. Excellent results are achieved. Various types of bag filters are compared in a table.

19444 APTIC NO. 38679

Holcombe, J. Kirby and Peter Kalika

TYPES OF FILTERS FOR CONTROLLING INTERIOR AIR POLLUTION. *Plant Eng., 26(6):92-94, March 23, 1972.*

Roughing filters and medium, high, and ultrahigh-efficiency filters are indicated for the control or particulates with air-conditioning systems. The efficiency of a filter is expressed by the per cent of incoming airborne dirt it retains. Common methods for measuring efficiency are by weight, particle count, discoloration on suitable media, or penetration of special media. Prefilters, either roughing, medium or sometimes high efficiency, are normally used to reduce loading and prolong life of the expensive ultrahigh-efficiency filters. Two types of electronic cleaners the charged-media cleaner and the plate-type cleaner are commonly used while activated charcoal is generally effective for control of a variety of gaseous air pollutants. Air washers may be used for particulate and gaseous pollutant control. With proper application potassium permanganate is quite effective for controlling odors in air conditioning systems. The efficiency of air cleaning components is discussed.

19445 APTIC NO. 38056

Holden, Herbert K.

ACTIVATED CARBON FILTER. *(American Filtrona Corp., Richmond, Va.) U. S. Pat. 3,611,678. 4p., Oct. 12. 1971. 4 refs. (Appl. Oct. 3, 1968, 9 claims).*

A bonded charcoal filter is provided which has good adsorptivity, is self-contained, is disposable, and has a low pressure drop. The filter contains fine powdered activated charcoal and a thermosetting or thermoplastic resin binder. It has voids in sufficient amount to provide a pressure drop of about 0 to 0.5 inch of water at a face velocity of up to approximately 450 ft per min. The method of manufacturing the filter includes mixing the dry ingredients and sufficient water, charging to a mold, applying sufficient pressure, and curing the resulting filter. The filter can be manufactured at a low cost and can be utilized in existing air conditioning equipment. (Author abstract modified)

19446 APTIC NO. 37882

Holler, George J., Jr.

SMOKE CONTROL SYSTEM. *(Assignee not given.) U. S. Pat. 3,615,248. 4p., Oct. 26, 1971. 4 refs. (Appl. Jan. 12, 1970, 6 claims).*

Most of the previous systems which have been developed for eliminating or reducing pollution of the air are expensive and not altogether effective. Filter systems have also entailed the problem of frequent replacing and/or cleaning of the filter units. Smoke control apparatus is described which comprises means for directing the smoke to an afterburner which is heated by an electric coil. In the afterburner, the smoke is agitated into a turbulent condition to effect complete combustion of any combustible materials before being passed through a filter, formed of expanded blast furnace slag. The gases then pass through a blower and thence through a second slag filter and back to the stack.

19447 APTIC NO. 38556

Hoyt, Kenneth C.

AFTERBURNER. *(Assignee not given.) U. S. Pat. 3,628,903. 4p., Dec. 21, 1971. 3 refs. (Appl. May 11, 1970, 8 claims).*

An afterburner for completing the combustion of stack gases is described which has a fuel supply to the interior of the stack and a mechanically controlled pilot which is blown by a jet of gas into the stack to ignite the fuel. The jet flows into the stack parallel with the fuel supply. The pilot and the fuel emerge centrally in the stack and are deflected by a downward concave deflector that cooperates with a larger upward concave deflector. An annular downwardly opening hood surrounds the stack and shields the pilot and the secondary air inlets. (Author abstract modified)

19448 APTIC NO. 37919

Huglo, Bernard J.

MOBILE SUCTION CLEANERS FOR PULVERULENT MATERIAL. *(Manutair, Amiens (France)) U. S. Pat. 3,608,283. 4p., Sept. 28, 1971. 5 refs. (Appl. Oct. 29, 1968, 5 claims).*

A mobile cleaning apparatus is described for cleaning a locality having dust-laden surfaces. It comprises a mobile carriage on which is mounted a separation container, a filtration container, and a suction means for inducing a flow of polluted air through both containers in order to purify it. The separation container is pivotable and detachable to facilitate its emptying. Previous mobile cleaners were generally heavy and bulky. The separation container filled up very quickly and it was necessary to move the mobile cleaner to a given place at frequent intervals in order to empty the separation container and possibly the filtration container. (Author abstract modified).

19449 APTIC NO. 38619

Hugo, P. and M. Jakubith

DYNAMIC BEHAVIOUR AND KINETICS OF CARBON MONOXIDE OXIDATION ON PLATINUM CATALYSTS. *(Dynamisches Verhalten und Kinetik der Kohlenmonoxid-Oxidation am Platin-Katalysater). Text in German. Chem. Ing. Tech., 44(6):383-387, 1972. 42 refs. (Presented at the Verfahrens-Ingenieure, Annual Meeting, Nuernberg, West Germany, Sept. 21-23, 1971.)*

Irregular fluctuations and periodic behavior observed during carbon monoxide oxidation on platinum catalysts under isothermal conditions in a flow-recycling reactor were examined. Measured formal kinetics were used to interpret the irregular fluctuations, and the peculiarities of CO-chemisorption on platinum were studied to define the periodic reaction course. The process involves two chemisorption states of CO, interpreted as the linear structure COL and the bridging structure COB, which is a masked intermediate in CO oxidation. The observed periodicity, therefore, is the slow reversible conversion of COL into COB which, at certain CO partial pressures, leads to a decrease in the reactive intermediate COB with an increase of the CO partial pressure in the recycling gas.

19450 APTIC NO. 38192

Hurst, Thomas B. and Roy G. Winklepleck

GAS-CLEANING APPARATUS. *(Babcock and Wilcox Co., New York) U. S. Pat. 3,630,496. 9p., Dec. 28, 1971. 10 refs. (Appl. Jan. 26, 1968, 10 claims).*

A modified design for a venturi-type gas-cleaning apparatus adapted for use with a basic oxygen furnace used in steelmaking is presented. Prior designs have included a variable throat area to allow maintenance of a constant pressure drop; while the variable throat venturi is generally satisfactory, the relative complexity due to moving parts and the consequent increase in size and cost present disadvantages in its adaptation to furnace gas cleaning systems. The present apparatus provides for joint regulation of the speed and power level of an induced draft fan to maintain a constant gas volume flow rate through the venturi scrubber connected in series with the fan. A substantially constant pressure drop, therefore, is maintained, causing improved gas cleaning. (Author abstract modified)

19451 APTIC NO. 37824

Ibach, Werner and Leopold Slawiczek

SEALING CUP FOR ELECTROSTATIC PRECIPITATORS. *(Knapsack Aktiengesellschaft (West Germany)) U. S. Pat. 3,627,898. 7p., Dec. 14, 1971. 9 refs. (Appl. Aug. 25, 1969, 10 claims).*

A sealing cup centrally traversed by a conductor is presented for use as a safeguard against the formation of overpressure and subpressure in electrical precipitation apparatus. The sealing cup comprises a trough partially filled with a sealing liquid and having a plurality of annular chambers and a bell-shaped member with bell-shaped cylinders arranged to dip into the annular chambers. The water present in the inner annular chamber definitely avoids fire outbreaks, while the sealing cup is so designed to enable the escape of gas normally accompanied by fire and explosions. The bell-shaped member is made of electrically insulating material while the trough is made of a metal such as iron. (Author abstract modified)

19452 APTIC NO. 38531

Imai, Hisashi

INTERNAL COMBUSTION ENGINE EXHAUST GAS CLEANING APPARATUS. *(Neinen kikan no [illegible]ki gasu joka sochi). Text in Japanese. (Assignee not [illegible]n.) Japan. Pat. Sho 47-1137. 3p., Jan 12, 1972. (Appl. [illegible]pril 25, 1969, 1 claim).*

The purpose of this invention is to purify exhaust gas from the interal combustion engine by means of oxidation by catalyst particles. The exhaust gas emitted from the guiding pipe forms a centrifugal current with the help of guiding vanes and flows into a venturi pipe in a given angle. The residual carbon particles in the exhaust are separated by the centrifugal power of the current and drop into the ring space between the cylinder shell and the inner guiding pipe. The gas moves on in the venturi pipe. The minus pressure of the center of the centrifugal current sucks in the secondary air from the air supply pipe in the center of the venturi. The exhaust gas further sucks in atomized catalyst from a suction pipe at the narrow passage of the venturi pipe. The exhaust heat heightens the catalytic action and quickens cleaning of the gas. Toward the end of the venturi pipe, another set of guiding vanes are installed which adjust the direction of the gas current. The catalytic action is completed in the adjoining chamber before the exhaust gas is emitted. The catalyst particles are dropped by centrifugal separation into a ring space between the inner wall of the cylinder shell and the outer wall of the venturi. The pressure difference between the ring space and the catalyst tank will suction the catalyst particles back to the tank. The clean exhaust gas is then emitted.

19453 APTIC NO. 38642

Inagaki, Koshiro

DRY TYPE SMOKE DESULFURIZATION TECHNIQUE USING METAL OXIDE CATALYST. *(Kinzoku sankabutsu ni yoru kanshiki haien datsuryu gijutsu). Text in Japanese. Kogai (Hakua Shobo) (Pollution Control), 7(1):21-26, Jan. 1972.*

The new metal oxide catalyst for smoke desulfurization and the smoke desulfurization process using it are discussed. Crushed coal is used as the carrier to make up the new metal oxide catalyst, so that the adsorptivity of the coal can be utilized to improve desulfurization effect. Various metals such as magnesium, calcium, aluminum, copper, chromium, cobalt, molybdenum, manganese, nickel, and iron were tested in the preliminary experiment designed to find the most effective one. As a result, copper, nickel, and chromium were found most effective. In the case of copper, the desulfurization efficiency was highest (about 91%) when the copper catalyst was 0.1% to the carrier. With nickel, it was highest (about 82%) when the nickel amounted to 3-5%. The effect of smoke temperature on the desulfurization efficiency of the copper catalyst was examined. The test indicated that it maintained a high desulfurization efficiency even above 200 C, whereas the desulfurization efficiency of the activated carbon method dropped drastically from 150 C of the smoke temperature. When copper or nickel is used as catalyst, the problem arises of the possible melting with the sulfuric acid generated. This problem was solved by arranging the catalyst in a spinel-shape structure and heating it at 1000 C or higher to make it form a composition comprising body-centered cubic structures. This catalyst not only gave almost 100% desulfurization efficiency, but also oxidized 100% of the 200-300 ppm nitrogen oxides contained in the emission gas and removed them through adsorption by the carrier. Therefore, the new catalyst will be applied effectively to the removal of harmful gases from automotive emissions. A flow sheet of the dry type desulfurization process using this new catalyst is shown with explanations on the design and operation.

19454 APTIC NO. 37963

Inoue, Kiyoshi

METHOD EMPLOYING WAVE ENERGY FOR THE EXTRACTION OF SULFUR FROM PETROLEUM AND THE LIKE. *(Assignee not given.) U. S. Pat. 3,616,375. 14p., Oct. 26, 1971. 4 refs. (Appl. Feb 3, 1967, 14 claims).*

Many proposed petroleum desulfurization processes are uneconomical and may severely modify the composition of the oil. The method described avoids these disadvantages wherein a crude or fuel oil containing organic molecules having at least some chemically bound sulfur is subjected to wave energy in the range of kilocycles/sec to megacycles/sec. This high-energy activation at relatively low temperatures ruptures the carbon-sulfur bonds of the molecules and forms either hydrogen-sulfur or carbon-sulfur bonds. Thus, a major proportion of the sulfur is reformed into compounds such as hydrogen sulfide and carbon disulfide which are gaseous at ambient temperature and readily evolved from the liquid oil. The periodic high energy can be an impulsive spark discharge alone or accompanied by vibrational shock of sonic or ultrasonic frequency; laser activation with or without sonic waves is also suitable. The apparatus includes an activation chamber through which the crude oil is pumped while being transported, means for recovering or discharging the gases, and one or more sulfur-removing devices such as a spark-discharge electrode assembly, ultrasonic or sonic transducer, laser, or microwave generator.

19455 APTIC NO. 37944

Irodov, M. V., N. P. Yakovleva, and N. A. Berlinskaya

COMPOSITION OF WASTE GASES FORMED DURING THE REAGENTLESS CLEAVAGE OF FATS. *(Sostav vybrosnykh gazov, obrazuyushchikhsya pri bezreaktivnom rasshcheplenii zhirov). Text in Russian. Maslob.-Zhir. Prom.), 37(7):33-34, 1971. 5 refs.*

In the high temperature reagentless cleavage of fats, a number of new substances, some of which are malodorous, are produced. The mixture of vapors and gases coming from the autoclave can be passed through a system of expanders and heat exchangers, where the vapors condensed. Uncondensed vapors are then let into the atmosphere. They are free of odor, since the malodorous substances dissolve in the condensate. Composition of the waste gas was analyzed at two points in the process: the condensate after the first expander and condensate in a last condenser through which the gases pass before they are let into the atmosphere. The analysis included the determination of low-molecular-weight fatty acids and qualitative determination of acrolein and amino compounds. In all samples, a small amount of formic and acetic acids, acrolein, and amino compounds was found, which obviously cause the odor of gaseous mixture and which are completely dissolved in water. The total amount of organic acids dissolved in the condensate was 0.006-0.024% (calculated as acetic acid). Their content in the condensate after the first expander was three times higher.

19456 APTIC NO. 37827

Ise, Yotaro and Toshio Kikuchi

DESULFURIZATION AGENT. *(Datsuryuzai). Text in Japanese. (Japan Chemical Engineering Co., Ltd., Tokyo) Japan. Pat. Sho 46-39081. 3p., Nov. 17. 1971. 1 ref. (Appl. May 1, 1968, 1 claim).*

The method of manufacturing a highly effective desulfurization agent by mixing zinc oxide with a small amount of alkali metal compounds such as lithium hydroxide, sodium hydroxide, potassium hydroxide, sodium silicate, lithium silicate, potassium silicate, lithium carbonate, sodium carbonate, potassium carbonate, sodium hydrogen carbonate, potassium hydrogen carbonate, sodium aluminate, or sodium zincate is described. The proportion is one mol of Zn to approximately 0.0001 to 0.2 mol of alkaline metal compound mentioned above (either singly or by a combination of two), with or without a binder or cement, gypsum, or artificial or natural silica. They should be thoroughly and evenly mixed and formed into pellets by extrusion or any other ordinary method of formation.

19457 APTIC NO. 37829

Ishigaki, Shinichi

SERIES OF POLLUTION CONTROL (11) GULF HDS. *(Kogai taisaku sirizu (11) Garufu HDS purosesu). Text in Japanese. Ryusan (J. Sulphuric Acid Assoc., Japan), 24(10):373-376, Oct. 1969.*

The history, principles, and the results of the application of the Gulf method of hydrodesulfurization in Japan are discussed. The pilot plant was operated for 12 mo in 1969 with a 2300 ml capacity reactor at 343 to 455 C temperature, 35 to 200 kg/sq cm pressure, and 60 to 300 N cu m/bbl gas quantity, varying the oil flow speed between 0.3 to 3.0. The first actual plant operation was carried out at the Mizushima Oil Refinery of the Japan Mining Co. It was designed first to treat 27,760 kl of residual oil to produce oil with 1% sulfur content by the BSD method, and the catalyst was to be changed every six months. The reactor consisted of two separate systems and both simultaneous and separate operations were possible. The material oil was treated and microparticles were eliminated before entering the reactor. The recycle gas was scrubbed, hydrogen sulfide was eliminated, and sulfur was recovered. The performance capacity of the reactor was examined by variable operations and it was concluded that 40 to 120% of the designed capacity operation was possible. The durability of the catalyst seemed excellent and stable. The recovery of sulfur was achieved by oxidation of hydrogen sulfide. Effective oxidation was achieved by burning part of hydrogen sulfide. Effective oxidation was achieved by burning part of hydrogen sulfide in order to obtain the H_2S and sulfur dioxide ratio or 2:1.

19458 APTIC NO. 38701

Jablin, Richard

EXPANDING BLAST FURNACE SLAG WITHOUT AIR POLLUTION. *J. Air Pollution Control Assoc., 22(3):191-194, March 1972. 2 refs. (Presented at the Air Pollution Control Association, Annual Meeting, 64th, Atlantic City, N. J., June 1971, Paper 71-160.)*

Expansion of blast furnace slag in the steel industry causes emissions of hydrogen sulfide. A new process, called pelletizing, is described for the control of H_2S emissions and the production of a superior slag product. The machine receives slag directly from the blast furnace and uses a rotor to prevent the rapid accumulation of slag at the point of cooling. The slag flows into the machine, hits the water sprays, and is immediately chilled, expanded, and pelletized. The rotor throws the pellets forward in an arc to a pile, where it is loaded for transport. Process modifications to alleviate the noise and improve pellet structure are considered.

19459 APTIC NO. 38598

Jaeger, Walter and Theo H. Kellpart

METHOD AND APPARATUS FOR SEPARATING FOREIGN MATTER FROM GASES. *(Ovitron Corp., Newburgh, N. Y.) U. S. Pat. 3,599,398. 8p., Aug. 17, 1971. 9 refs. (Appl. Jan. 12, 1970, 16 claims).*

A method and device for the separation and recovery of very fine mists and dust particles from a gaseous stream, with particular application in the chemical processing industries and in the field of air pollution, are presented. The device improves on existing separators by providing a novel separator which may be simply and easily constructed and adjusted to remove particles of a size range greatly in excess of that generally removable by conventional devices. It is also capable of removing dusts, mists, and sulfur dioxide, simultaneously, at a high degree of efficiency. The separator does not clog when operated to specifications and may be constructed of corrosive-resistant materials without impairing efficiency. The device consists of a chamber for receiving a mixture of a suspended washing liquid and the gaseous stream. The chamber has at least one orifice slot passing through the wall and is characterized by an enlarged gas entry portion which extends into the chamber wall and converges into a reduced linear throat portion. The length of the slot is substantially greater than the width opening of the throat portion with means provided for accelerating the gas flow through the gas entry portion and out through the throat of the slot. By accelerating the gas-spray mixture to a speed within 30-200 m/sec, the entrained material agglomerates into heavier particles which fall out of the gas mixture after passing through the throat of the slot. The agglomerated liquid and heavier particles settle out in the next chamber. (Author abstract modified)
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19460 APTIC NO. 38010

Javorsky, Bronislav S. and Erik A. Gramer

APPARATUS FOR SEPARATING DUST FROM A GAS. *(Alfa-Laval AB, Tumba (Sweden)) U. S. Pat. 3,616,610. 3p., Nov. 2, 1971. 3 refs. (Appl. Nov. 14, 1968, 7 claims).*

A new apparatus is presented for separating dust particles from gases, such as chimney gases, which are not allowed to be subjected to a substantial pressure drop. The dust-containing gas is caused to flow through a channel charged with a foam (a colloid system of a gas dispersed in a liquid) which is formed independently of the kinetic energy of the flowing gas. The gas is forced to pass through and be filtered by the foam. (Author abstract modified)

19461 APTIC NO. 38246

Johnson, J. Enoch and Foster J. Woods

FLAMMABILITY PROPERTIES AND COMBUSTION PRODUCTS OF ACTIVATED CHARCOAL USED IN ATMOSPHERE PURIFICATION. *Preprint, Combustion Inst., Pittsburgh, Pa., 16p., 1970. 4 refs. (Presented at the Combustion Institute, Central States Section Meeting, April 1970.)*

The flammability properties and combustion products of activated charcoal contained in fixed filter beds for atmospheric purification are examined. The flash points of hydrocarbons contained on activated charcoal approached, but were not lower than the flash points of the liquid hydrocarbons themselves. Charcoals saturated with hydrocarbon vapors can, therefore, be serious flammable hazards. There was no catalytic action by the activated charcoal to promote the spontaneous ignition of hydrocarbons. Under flow conditions, charcoals saturated with hydrocarbons during use in air purification systems had minimum ignition temperatures at least as low as the hydrocarbons themselves. Large quantities of carbon dioxide and carbon monoxide were evolved; under some conditions, essentially all of the oxygen was removed from the gas stream. Significant amounts of CO were evolved, however, even under precombustion conditions. (Author summary modified)

19462 APTIC NO. 38130

Johnson, L. L., W. C. Johnson, and D. L. OBrien

THE USE OF STRUCTURAL CERAMICS IN AUTOMOBILE EXHAUST CONVERTERS. *Chem. Eng. Progr. Symp. Ser., 57(35):55-67, 1961. 7 refs.*

A honeycomb ceramic bed for a platinum-on-alumina catalytic afterburner was evaluated in terms of pressure drop, temperature control, secondary air supply, and acoustic and mechanical properties. Road shocks sufficient to dent the afterburner did not cause appreciable damage to properly mounted honeycomb blocks. No attrition loss was evident and noise levels and pressure drop were low. In thermal shock tests, the ceramic withstood 500 cycles of heating from 1500-2200 F and cooling again in 2 min. Decreased start-up time and improved temperature and air control were obtained with a prototype multipass honeycomb bed design. Tests with this prototype again demonstrated that honeycomb ceramic structures extend the lifetime of a catalyst known to be sensitive to lead. Most of the advantages of ceramic materials were also realized in a noncatalytic afterburner with honeycomb heat exchangers. However, heat losses were high.

19463 APTIC NO. 37843

Johnson, Philip C.

FUME INCINERATOR. *(Air Preheater Co., Inc., Wellsville, N. Y.) U. S. Pat. 3,607,118. 4p., Sept. 21, 1971. 1 ref. (Appl. July 3, 1969, 2 claims).*

A fume incinerator is described in which gases containing harmful or obnoxious fumes are preheated before being directed into the combustion chamber. The preheated gases which contain air for combustion are then thoroughly mixed with fuel and burned. The fumes are then subjected to the heat from combustion and are thus completely eliminated from the effluent gases. Unlike the prior art, the present fume incinerator concentrates deformation resulting from thermal expansion and contraction in a single plane in which novel expansion joints are located to permit relative movement of the several integral parts without causing breakage and leakage. A minimum of maintenance is required. (Author abstract modified)

19464 APTIC NO. 38557

Jones, Royal R.

CONDENSING UNIT AND METHOD OF USE. *(Cincinnati Butchers Supply Co., Ohio) U. S. Pat. 3,629,994. 4p., Dec. 28, 1971. 5 refs (Appl. March 30, 1970, 15 claims).*

A condensing unit is described which efficiently and effectively treats meat packing plant waste to eliminate objectionably odorous gases, liquids, and solids which could otherwise pollute surrounding air and nearby waterways. The treatment is characterized by a two-step condensing operation in which the second stage operates only in the event of overburdening of the first stage of operation. (Author abstract modified)

19465 APTIC NO. 38277

Juentgen, Harald, Karl Knoblauch, and Franz Maier

THE DESULFURIZATION OF WASTE GASES ACCORDING TO THE METHOD BY THE BERGBAU-FORSCHUNG. *(Die Entschwefelung von Abgasen nach dem Verfahren der Bergbau-Forschung). Text in German. Gas Wasserfach Gas Erdgas (Munich), 113(3):127-131, March 1972. 5 refs. (Presented at the Erfahrungsaustausche der Gaschemiker, Constance, West Germany, 1971.)*

A special activated coke was developed on the basis of hard coal to desulfurize waste gases from thermal power plants and from the chemical industry. The S02 in waste gases is bound on the inner surface of the activated coke by adsorption where it is converted to sulfuric acid by reaction with oxygen and water vapor, also adsorbed from the waste gas. The sulfuric acid remains adsorbed up to temperatures of 220 to 250 C so that a high S02 retention up to temperatures of 160 C is guaranteed. The activated coke has a grain diameter of 9 mm; it does not erode easily and has an ignition point of 400 C. The waste gases are desulfurized in a travelling layer reactor which the activated coke passes from top to bottom. The sulfuric acid-laden coke is regenerated in an inert atmosphere with hot sand. Dust can also be retained by the activated coke. The process was tried out in a plant with a capacity of 3000 cu m/hr during two years of operation. The degree of desulfurization can be varied between 100% at 10 hrs coke residence time and 78% at 40 hrs coke residence time.

19466 APTIC NO. 38324

Juentgen, Harald, Martin Kruel, and Dieter Zurawsky

CATALYTIC COMPOSITIONS FOR INCREASING AND MAINTAINING THE ACTIVITY OF CARBON-CONTAINING ADSORBENTS FOR REMOVING SULFUR FROM WASTE GASES. *(Verfahren zur Steigerung und Aufrechthaltung der Aktivtaet von fuer die Entschwefelung von Abgasen verwendeten kohlenstoffhaltigen Adsorptionsmitteln). Text in German. (Bergwerksverband G.m.b.H., Essen (W. Germany) W. Ger. Pat. Appl. 1,619,840. 5p., Oct. 6, 1967. (2 claims).*

The catalyst is an activated carbon material such as that obtained by coating the surface of coke or semicoke made from peat, lignite, or coal with greater than or equal to 15% of a mixed catalyst comprising 20-50% vanadium compounds, and 50-80% of compounds of potassium, lithium, or barium and/or aluminum, chromium, silicon, or titanium. The sulfur dioxide-containing gases are passed over this catalyst to 100-200 deg to oxidize the SO2 to sulfur trioxide, which is immediately hydrolyzed to sulfuric acid and retained in the pores of the catalyst. The catalyst is regenerated by heating to 400-600 deg in an oxygen-free atmosphere whereupon the following reaction takes place: 2 sulfuric acid + C yields 2 SO2 + carbon dioxide + 2 water. The regenerated catalyst is at least as effective as the original. Thus, a coke of grain size of 1-2 mm is prepared from pre-oxidized coal by a special process involving a loss by burning of 60% and activation of water vapor. A suspension or solution of ammonium metavanadate (4.6 g), potassium sulfate (4.4 g), and titanium sulfate (6.6 g) in 50 ml H2O is sprayed on 94 g of the coke to provide a catalyst containing 3.9% vanadium pentoxide, 2.6% potassium oxide, and 3.5% titanium dioxide. A flue gas containing 0.3 vol% SO2, 3.0% oxygen, 6.0% hydrogen sulfide, and 90.7% nitrogen is passed over the catalysts at 120 deg for 5 sec. The catalyst sprayed with the mixed compounds has 10-20 times the activity of the untreated catalyst and after six cycles of absorption and desorption, the activity of the treated catalyst is approximately the same as its original activity.

19467 APTIC NO. 38614

Kaji, Katsuhisa

AUTOMOTIVE EXHAUST GAS CLEANER. *(Jidosha yo haiki gasu seijosochi). Text in Japanese. (Nisshin Kogyo Co., Ltd. (Japan)) Japan. Pat. Sho 47-5331. 5p., Feb. 15, 1972. (Appl. Sept. 30, 1969, 1 claim).*

Both a muffler with a self-contained catalyst designed to remove carbon monoxide, unburned hydrocarbons, and other impurities of the automotive exhaust gas and a lead filter to remove tetraethyl lead which becomes lead bromide, they are usually of a design so that the exhaust gas may flow through them all the time, regardless of the engine mode. It is well known that the quantity of harmful substances contained in the exhaust gas differs with driving modes and that these cleaning devices are not required at all under certain modes. Continuous exposure to exhaust gas naturally shortens the devices life span, especially that of the catalyst. This cleaner is designed so the exhaust gas may flow through the catalyst and the lead filter only when the exhaust gas has to be cleaned with them. To achieve this, it is equipped with the flow-channel control valve. The control valve installed in the exhaust gas channel consists of the electromagnetic valve (stop valve) synchronized with the negative pressure generated in the intake manifold of the engine and with opening of the carburetor s throttle valve controlling this negative pressure and the centrifugal positioner operating according to the rpm of the engine.

19468 APTIC NO. 37809

Kajitani, Eiji and Shoji Niida

EQUIPMENT FOR COOLING AND SCRUBBING CORROSIVE HOT GASES. *(Einrichtung zum Kuehlen und Waschen korrodierender heisser Gase). Text in German. (Sumitomo Metal mining Co., Ltd., Tokyo (Japan)) W. Ger. Pat. 1,671,404. 4p., Oct. 14, 1971. 2 refs. (Appl. May 31, 1967, 3 claims).*

The equipment includes a cylinder with outlets for gas and liquid in the lower part, and a top cover lined with an organic acid-proof material, which contains the gas inlet and the sprayers for the cooling and washing liquid. The cylindric part made of glass fiber reinforced thermoset is lined on the inside with a tissue resistent to solutions containing fluorine, and has a circular channel on its top edge for the cooling liquid. The top cover is separated from the cylindric part by a corrosion-resistant flexible foil to prevent stresses. The admission temperatures range from 100 to 300 C, and the gas to be cleaned may contain sulfur dioxide, fluorine, and chlorine.

19469 APTIC NO. 38470

Kaleskas, Edward W.

WPI GROUP USES PROPANE AND CATALYTIC CONVERTER TO PRODUCE CLEAN- BURNING VEHICLE. *Automotive Eng., 79(10):44-45, Oct. 1971.*

By burning propane, modifying the ignition timing, and adding catalytic converters to a six-passenger sedan, the Worcester Polytechnic Institute propane group succeeded in producing a vehicle that meets the strict 1976 Federal emission standards. This car made the complete trip in the 1970 Clean Air Car Race from Cambridge, Mass., to Pasadena, Calif., with no failures en route and won the gaseous fuel class for internal combustion engines. A 350-cu inch Chevrolet engine was selected as the power-plant, and the original transmission was replaced by a heavy-duty three-speed turbo-hydromatic transmission, which provided controlled, precise shifts that were to be important in the dynamometer tests involving the 7-mode cycle. Factory modifications included impact extruded pistons, satellite-faced valves, hard valve seats, and deletion of the gasoline fuel system. The Ensign variable venturi carburetor was used for the fuel metering system. Test results are discussed.

19470 APTIC NO. 38597

Kamino, Yasumi, Shiro Inoue, Kanji Hota, and Toshio Hama

DESULFURIZATION OF FLUE GAS BY ACTIVATED CARGON, SIXTH REPORT. RECOVERY OF DETERIORATED CARBON. *(Suijoki datsurishiki kasseitan-ho haien datsuryu (dairoppo), ressei kasseitan no saisei). Text in Japanese. Preprint, Japan Chemical Society, Tokyo, p. 238, 1971. (Presented at the Japan Chemical Society, Fall Meeting, 25th, Osaka, Japan, Oct. 11-14, 1971.)*

Deteriorated carbon pieces were heated in various gas atmospheres in order to see the recoverability of sulfur dioxide adsorption capacity. They were heated to the temperatures between 300 to 800 C in gaseous evironments of hydrogen, steam, carbon monoxide, nitrogen, carbon dioxide, and nitrogen plus 10% carbon dioxide. Heating definitely helped to recover the adsorption capacity of deteriorated activated carbon; the degree of adsorption recovery depended on the heating temperature; in a hydrogen environment, the activity was recovered at approximately 500 C, and in other gases, 700 C was needed to recover the adsorption capacity of a fresh carbon. As a result of treatment, an increase of acid adsorption and a decrease of basic radical adsorption was noted. A treatment of longer than 30 min did not increase the adsorption capacity. A certain amount of damage and wear could not be avoided from the heat treatment. The steam environment did the most damage to the carbon when heating to recover its complete adsorption capacity.

19471 APTIC NO. 37998

Kayatz, K. -H.

FULLER COOLER FOR 4000 TONS PER DAY AND GRATE COOLER WITHOUT DUST COLLECTING EQUIPMENT. *(Fuller-Kuehler fuer Leistungen von 4000 t je Tag und Rostkuehler ohne Entstaubungseinrichtungen). Text in German. Zement-Kalk-Gips (Wiesbaden), 60(12):574-575, Dec. 1971. (Presented at the VDZ-Kongress 71 Verfahrenstechnik der Zementherstellung, Duesseldorf, West Germany, Sept. 9-Oct. 1, 1971.)*

With increasing kiln capacities and more stringent regulations concerning dust emission, the dust cleaning systems have become so large and costly that a way had to be found which avoids dust collection of the waste air. One solution is the reduction of the dimensions of the grate cooler to a size which permits the highest possible pre-heating of the secondary air for the rotary kiln. With this secondary air, the clinker can be cooled from 1350 C to 400 C. In a second cooling system, constructed on the recuperator principle, the clinker is cooled with fresh air to below 100 C. The heated air coming from this cooler is free from dust and can be discharged into the open. A second solution of a grate cooler without necessitating dust cleaning is based on the uninterrupted circulation of part of the cooling air over a heat exchanger where fresh air cools the cooling air to an extent which permits renewed passage over the grate cooler. The grate cooler itself can maintain the conventional size.

19472 APTIC NO. 38712

Keilin, Bertram and Arthur L. Walitt

PROCEDURE FOR THE CONVERSION OF SULFUR DIOXIDE INTO SULFURIC ACID. *(Verfahren zur Umwandlung von Schwefeldioxyd in Schwefelsaeure). Text in German. (Tyco Labs., Inc., Waltham. Mass.) W. Ger. Pat. Appl. 2,113,428. 27p., March 19, 1971. (16 claims).*

A process for the recovery of sulfuric acid from waste gases containing sulfur dioxide, nitrogen oxides, and water is presented. The gases are treated with nitrogen dioxide to oxidize the SO2 to sulfur trioxide, which is then washed out of the waste gases together with the NOx. The residual gas is vented to the atmosphere without cooling. The nitrosylsulfuric acid from the scrubber is contacted with a catalyst and with a fraction of the untreated waste gas to oxidize the NOx to nitrogen dioxide which is partly recycled to the SO2 oxidation step and partly released as nitric acid. The gas cleaned of NO2 is mixed with the waste gas entering the SO2 oxidation step. Part of the sulfuric acid from the catalytic stripping process is removed as a by-product, and the rest is recycled to the SO2 scrubbing step.

19473 APTIC NO. 38474

Keith, Carl D., John J. Mooney, and Kenneth W. Blamble

CATALYTIC EXHAUST PURIFIERS. *(Engelhard Minerals and Chemicals Corp., Newark, N. J.) U. S. Pat. 3,597,165. 5p., Aug. 3, 1971. 4 refs. (Appl. June 18, 1969, 2 claims).*

A catalytic purifier for the treatment of internal combustion engine exhausts and designed to eliminate external manifolding to separately housed catalyst bodies is described. It comprises a catalyst support plate equipped for housing a plurality of ceramic catalyst blocks, and it is particularly useful for purifying exhausts of large displacement engines, e.g. those exceeding 400 cu in/cycle. (Author abstract modified)

19474 APTIC NO. 38223

Kelmar, John J.

NONPOLLUTING CONSTANT OUTPUT ELECTRIC POWER PLANT. *(Assignee not given.) U. S. Pat. 3,628,332. 4p., Dec. 21, 1971. 4 refs. (Appl. April 16, 1970, 13 claims).*

Oxygen can be delivered to a gas producer to gasify coal to produce fuel which is then delivered with more oxygen to a boiler furnace to generate steam and to form products of combustion that include water vapor and carbon dioxide. The water vapor is condensed and separated from the carbon dioxide. The steam is conducted to a steam turbine at a rate that enables it to operate the plant at substantially full capacity continuously. The turbine drives an electric generator. During periods of reduced load, surplus power from the plant is used for liquefying some of the separated carbon dioxide. Some of the surplus power is also used for operating air separation apparatus, to which the liquefied carbon dioxide is conducted to air in producing liquid oxygen in excess of the oxygen requirements of the gas producer and furnace during the reduced load period. The surplus liquid is stored for use, after warming, in the plant between the periods of reduced load when the air separation apparatus is not operating. (Author abstract modified)

19475 APTIC NO. 38695

Keranen, T. W. and H. P. Wertheimer

A STUDY OF SPARK-IGNITION-ENGINE CONTROL VARIABLES. *Bendix Tech. J., 4(3):40-50, 1971. 10 refs.*

Systematic testing of a fuel-injected 429-cu in. V-8 engine at steady states produced data to define the effects of air-fuel ratio, ignition timing, and percent of exhaust-gas recirculation on emission levels and fuel economy. As a function of these variables, data on brake-specific nitric oxide, hydrocarbon; and carbon monoxide emissions and fuel consumption were plotted. Exhaust-gas recirculation permitted NO control with a lower fuel- consumption penalty than extremely rich operation alone. Nitric oxide control was important at both high and low power levels; hydrocarbons were a greater problem at low power levels. An optimum engine size for a given vehicle weight is postulated. Simulation of warm-engine emission tests for comparing various control approaches indicated that entirely different calibrations are needed for different emission-performance goals. (Author abstract modified)

19476 APTIC NO. 38048

Keuls, Henry P. C.

AIR PURIFIERS AND HUMIDIFIER. *(Assignee not given.) U. S. Pat. 3,621,834. 4p., Nov. 23, 1971. 6 refs. (Appl. July 23, 1969, 4 claims).*

An improved, inexpensive air purifier is described which effectively purifies air without becoming clogged and without limiting the flow of air into the room. The window-mounted air purifier and humidifier comprises a housing with an inlet for external air covered by an insect excluding, non-dirt filtering screen, and an air outlet covered by an air filter. Incoming air impinges upon an air scrubber or wick mounted in a liquid reservoir. Generation of proper air flow paths are facilitated by a depending vane directed toward the wick. (Author abstract modified)

19477 APTIC NO. 38030

Khalafalla, S. E. and L. A. Haas

ACTIVE SITES FOR CATALYTIC REDUCTION OF SO2 WITH CO ON ALUMINA. *J. Catalysis, 24(1):115-120, Jan. 1972. 12 refs.*

The reduction of furnace gases containing 3% sulfur dioxide, 6% carbon monoxide, and the balance nitrogen by alumina catalysts was studied in a single-pass, fixed-bed flow reactor. To determine active sites for catalytic reduction, the catalysts were first subjected to chemical pretreatment with hydrofluoric acid, quinoline, ammonium hydroxide, or water and to flushing in situ with HF vapors, sulfur vapors, and other gaseous constituents. The hydroxide groups associated with the Bronsted acid sites in alumina were more influential in adsorbing sulfur dioxide than the more common Lewis acid sites. Hence, alumina in various slightly hydrated, acid-soluble forms, such as boehmite or gamma-alumina, was more efficient than high-temperature corundum or alpha-alumina. Catalyst pretreatment with HF diminished its activity because the incorporation of halogens in the alumina lattice enhanced its Lewis acidity and blocked the OH(-) groups in the Bronsted sites. Between 450-600 C, the catalytic activity of alumina was practically unaffected by pretreatment with an organic base, such as quinoline which normally blocks the Lewis acid sites. Elemental sulfur reactivated the alumina surface during the catalyst break-in period.

19478 APTIC NO. 37845

Kimberley, J. L.

LEAD IN GASOLINE. AN EVALUATION OF THE SITUATION IN THE UNITED STATES IN SEPTEMBER 1971. *(Blei im Benzin. Eine Betrachtung der Lage in den USA im September 1971). Text in German. Metall (Berlin), 26(1):65-67, Jan. 1972.*

There has been much talk about lead elimination in gasolines. Many argue that the lead has to be removed first from the gasoline in order to clean the exhaust gases by catalysts. There are several factors, however, which speak for the keeping lead in gasolines. The lead concentration in the atmosphere is at the moment still far below 4 micrograms/cu m in most cities. Despite seemingly increasing lead content of the atmosphere over large cities, no reliable proof exists that the lead content in the blood of the population is on the rise too. A study, concluded in Dec. 1969, revealed that the women in Pasadena had less lead in the blood than women living in Rittenhouse Square in Philadelphia, although the lead concentration in the air over Rittenhouse Square is just half as high as that in Pasadena. The inexpensive catalysts for cleaning the exhaust gases could not be realized. The costs rose to $500 by now. Systems with lead, with thermal reactors for carbon monoxide and hydrocarbon removal, and with waste gas recirculation for the elimination of the nitrogen oxides with particle collection seem so much better. There is a growing belief that lead-free gasolines will lead to an earlier wear of valves which might cause a massive increase of exhaust gases. There are continuous efforts to find new catalysts resistant to lead.

19479 APTIC NO. 38004

Klein, Heinrich

TORNADO-FLOW SEPARATOR WITH RAW-GAS PRECLEANSER. *(Siemens A. G., Munich (West Germany)) U. S. Pat. 3,616,619. 3p., Nov. 2, 1971. 18 refs. (Appl. Nov. 19, 1969, 2 claims).*

A dust-from-gas separator of the tornado-flow type is described which has its row-gas inlet equipped with a device for partially precleaning the entering gas flow. The device comprises a flow guide structure shaped as a body of rotation and coaxially mounted in the gas inlet duct to leave an annular interstice in which a coaxial group of guide vanes provides a helically twisting path for the gas flow. An axial tube of smaller diameter than the gas inlet duct has its inlet opening situated behind the vanes and receives the precleaned partial current of gas which flows near the axis of the duct, whereas the more heavily dust-laden outer portion of the gas flow enters into the tornado-flow separator vessel proper. (Author abstract modified)

19480 APTIC NO. 38402

Kleinschmidt, R. V. and A. W. Anthony, Jr.

PEASE-ANTHONY CYCLONIC SPRAY SCRUBBERS. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 310 - 317. 5 refs. (May 3-5, Louis C. McCabe, ed.)*

The theory of the cyclonic scrubbers is based on mechanical collision of water drops with the dust particles. A fine spray is formed in the axis of a rotating cylinder of the gas to be cleaned, so that every portion of the gas is swept by enough drops to insure a high probability of every dust particle being hit. Theoretical aspects of the scrubber as embodied in equipment design are discussed. Particle size and performance data for dusts from various industrial operations are given, and show a removal efficiency of 88% to better than 99%. Data for two cases of mist removal (castor oil, and fluorine compounds) show efficiencies of 78% and 97.8%, respectively. Data are also given for odors and acid gases. The range of applications and operating conditions for the cyclonic spray scrubber are discussed; in general, it is a highly effective, low-pressure drop device when operated on dusts larger than about 1 micron. It is a somewhat better gas absorber, under correct conditions, than a solids collector. Additional applications are anticipated.

19481 APTIC NO. 37999

Knizia, Klaus

THE EXPANSION OF THE POWER PLANT GERSTEINWERK BY 4 TIMES 400 MW. *(Erweiterung des Kraftwerks Gersteinwerk zur Zeit 4 Einheiten zuje 400 MW). Text in German. Brennstoff-Waerme-Kraft, 23(12):503-512, Dec. 1971.*

The four units of 400 MW each which are presently being erected in the power plant Gersteinwerk will be fired by natural gas from the Netherlands. Since this type of fuel produces hardly any dust and sulfur dioxide, a low stack height was originally planned. Experiments in the wind tunnel showed that the stack height had to be at least as high as the neighboring cooling towers, since the smoke plume would be cast to the ground at unfavorable wind velocities and wind directions due to turbidity fields caused by the cooling towers. With a stack height of 120 m, any inadmissible concentration of nitrogen oxides in the neighborhood is avoided. The stacks are built of weather-proof steel with a sheet thickness of 10 and 15 mm. Temperature drops below the dew point are avoided by the inner jacket. The flue gases leave the stack cross sections (about 23 sq m) with a mean exit speed of 17.5 m/sec.

19482 APTIC NO. 38385

Knop, W.

POLLUTION CONTROL IN PLASTICS PLANTS. *(Emissionsverminderung in Viskosebetrieben). Text in German. VDI (Ver. Deut. Ingr.) Ber., no. 149:251-259, 1970. 19 refs.*

The source of hydrogen sulfide and carbon disulfide in the manufacture of viscose rayon is xanthogenation. Both sulfur compounds are volatilized by washing baths and by steam from spinning bobbins and from fiber strands. The principal emission sources are encapsulated and equipped with exhausts, but it is impossible to prevent all emissions. Wet purification processes currently in use are based on either neutralization or oxidation. The former involves washing the waste gases with caustic soda which converts H_2S up to about 10% to sodium sulfide. Dry purification processes include H_2S destruction by a purification mass (bog iron ore, Lux mass, Laming mass) which is loaded with sulfur and is regenerated in special towers, and the so-called Sulfosorbon process where waste gas containing 1-10 g/cu m CS_2 and 0.5-2 g/cu m H_2S passes through an activated carbon adsorber which oxidizes H_2S and adsorbs CS_2. While the problem of waste gas purification has been satisfactorily solved in staple fiber production, this is not the case in viscose production primarily because all purification processes used were originally developed for the desulfurization of gases generated by the coking of anthracite. The degree of success of purifying waste gases generated by viscose plants is currently still dependent on the equipment, its arrangement and layout, and the various purification processes are still in a developmental stage. Dry processes were generally uneconomical; the recovery of CS_2 on the other hand, can be advantageous.

19483 APTIC NO. 38445

Kraft, Guenther and Heinz Beck

PROCEDURE FOR THE REMOVAL OF FLUORINE FROM WASTE GASES OCCURRING IN ALUMINUM FUSION ELECTROLYSIS SHOPS. *(Verfahren zur Entfernung von Fluor aus Abgasen, insbesondere solchen der Schmelzflusselektrolyse des Aluminiums) Text in German. (Metallgesellschaft A. G., Frankfurt, (West Germany)) W. Ger. Pat. 1,567,660. 3p., Dec. 23, 1971. (Appl. March 29, 1963, 2 claims).*

Removal of fluorine from gases developed in the process of fusion electrolysis in aluminum plants is achieved by treatment with lithium containing washing solutions. The washing solutions should include lithium (hydroxide), sodium, and aluminum in proportions so that the fluorine will be precipitated as an insoluble Li-Na-Al-F-complex. Optimum pH of the washing solution for this reaction is 3, but satisfactory results are achieved as long as the pH is kept below 6.

19484 APTIC NO. 38005

Krause, George D.

COLLECTING ELECTRODE PLATE ASSEMBLY. *(American Air Filter Co., Inc., Louisville, Ky.) U. S. Pat. 3,616,605. 3p., Nov. 2, 1971. 10 refs. (Appl. July 2, 1969, 1 claim).*

A collecting electrode plate assembly is provided for an electrostatic precipitator, comprising a plurality of identical sections which are easy to assemble in an economic fashion to provide a stable, efficient construction which permits quiescence adjacent the plates to prevent reentrainment of particulate materials. Each collecting electrode is made up of aligned sections. Each section includes a generally flat planar central body portion, a semicircular baffle leading edge portion, and a quarter circular baffle trailing edge portion. The trailing edge portion of one section nests within the leading edge portion of a successive adjacent similar section. (Author abstract modified)

19485 APTIC NO. 38276

Krebs, LeRoy J.

METHOD AND MEANS TO CONTROL AIR POLLUTION FROM MOTOR VEHICLES AND MOTOR VEHICLE ENGINES. *(Assignee not given.) U. S. Pat. 3,618,314. 5p., Nov. 9, 1971. 8 refs. (Appl. April 9, 1970, 6 claims).*

A system and means are presented for removing pollutants from vehicle motor emissions and fuel and oil evaporative emissions when the motor is operating. The evaporative emissions are collected in a collector unit and the motor exhaust port emissions filtered and treated. Particulate matter is collected and gases burned. A unit is designed to collect particulate matter and gases in a tube or tank having a series of chemical blocks which have an affinity for carbon and to which the carbon adheres. An admixture of water and glycerine is continuously sprayed over the blocks to help keep them clean. Gases are burned away by a high voltage spark gap in an afterburner which is provided with a series of spaced baffles which have an affinity to trap and hold carbon particles. A magnetic fly trap is placed between the afterburner and the atmosphere. (Author abstract modified)

19486 APTIC NO. 38383

Ksinsik, D. and G. Brueckel

CATALYTIC REMOVAL OF OXYGEN, HYDROGEN, AND CARBON MONOXIDE FROM GAS MIXTURES. *(Die katalytische Entfernung von Sauerstoff, Wasserstoff und Kohlenmonoxid aus Gasen). Text in German. Dechema Monograph., 68(1264-1291):215-224, 1971.*

Catalysts are being increasingly used in industrial processes to purify protective and inert gases, particularly to remove traces of oxygen, hydrogen, and carbon monoxide. The operative mechanism depends either on the catalytic conversion of impurities in a gas to readily removable compounds or on purification by absorption. Technological considerations determine whether the course of the reaction should be catalytic or absorptive. Precious metal and copper catalysts are employed for these processes; for the absorptive removal of oxygen in particular, only catalytically active copper oxide is used. For the removal of CO from flue gases, either platinum or copper catalysts are used. Palladium is not suitable since it becomes contaminated at low temperatures. The catalysts convert CO to carbon dioxide, which must in turn be removed from the cleaned gas. Important factors governing catalyst selection are required purity of the gases; operating costs, e.g., thermal energy, regeneration costs; resistance to catalyst poisons; effective life and costs of catalysts. By comparing the specific properties of catalysts, the application possibilities for a particular purification process can be determined with due regard to efficiency and economy.

19487 APTIC NO. 37780

Kulikov, G. S., Yu. P. Khlebnikov, V. G. Usatenko, and V. D. Shevchenko

STUDIES ON FILTER FABRICS FOR DRY FILTERS OF GENERAL USE. *(Issledovanie filtruyushchikh materialov dlya sukhikh filtrov obshchego naznacheniya). Text in Russian. Vodosnabzh. i Sanit. Tekhn., vol 11:16-18, March 1972. 3 refs.*

Various filter materials were studied to obtain general-purpose dry filters with high efficiencies even with important dust concentrations, with special regard to the possibility of regeneration. The aerodynamic characteristics of 38 materials in thicknesses of 7-8 mm maximum were studied with a specific air load of 10,000 cu m/sq m-hr and with maximum resistances of 10-15 kp/sq m. Of the 38 materials, 21 showing optimum resistances and were further studied in filtration tests with concentrations of 10-30 kp/sq m. The quartz dust used had a specific surface of 5600 sq cm/g. Some of the material showed good efficiencies with poor dust capacities (maximum 100 g/sq m). Four materials that were best had average efficiencies of 84.3, 84.8, 90.3, and 89.4% with dust capacities of 288, 347, 606, and 344 g/sq m. These were non-woven needle-punched synthetic materials. The regeneration was made by means of combined ultrasound and compressed air. Tests carried out on two of these materials after the first and second regeneration revealed an unimportant increase in the resistance (0.8-1.2 kp/sq m).

19488 APTIC NO. 38317

Kurita, Satoru, Takashi Watanabe, and Naoki Takayama

EFFECT OF PREPARATORY CONDITION OF COO-MOO3-AL2O3 CATALYST ON ACTIVITY FOR HYDRODESULFURIZATION OF KHAFJI RESIDUAL OIL. *(Kafuji genyu zanyu no suisoka datsuryu kassei ni oyobosu shokubai chosei joken no eikyo). Text in Japanese. Kogyo Kagaku Zasshi (J. Chem. Soc. Japan), 74(11):2264-2268, 1971. 7 refs.*

The effect of the cobalt/molybdenum atomic ratio, calcination temperature, and silica on the catalytic hydrodesulfurization of Khafji topped crude oil (cut point, 300 C at 1 atm) was studied in a fixed-bed reactor at 430 C and 100 kg/sq cm pressure. The liquid hourly space velocity was 1.0 vol/vol and the hydrogen/oil volume ratio was 1000 vol/vol. A cobaltous oxide-molybdenum trioxide-alumina catalyst (approximately 0-2.0 Co/mo) and a cobaltous oxide-molybdenum trioxide-silica-alumina catalyst (4.6 wt% CoO and 18 wt% MoO3) were used. The catalysts were calcined at 550, 650, and 750 C in air. Catalyst activity was affected by the Co/Mo ratio, the degree of sulfurization, and the degree of coke deposition. These factors were mutually related. Catalyst activity was highest at Co/Mo atomic ratios between 0.5-0.8 and at 650 C calcination. Coke deposition was minimum at the above atomic ratios and the degree of catalyst sulfurization was approximately 73-79%. Catalyst activity decreased with the addition of silica.

19489 APTIC NO. 38607

Kuwata, Tsutomu, Yutaka Oguchi, Junichi Kubo, and Hiroji Nomura

HYDROGENATION METHOD OF HEAVY PETROLEUM RESIDUE. *(Jushitsu sekiyu ryubun no suisoka datsuryuho). Text in Japanese. (Ministry of International Trade and Industry (Japan), Agency of Industrial Science and Technology) Japan. Pat. Sho 47-1021. 8p., Jan. 12, 1972. (Appl. March 30, 1968, 1 claim).*

Catalytic hydrogenation desulfurization of crude petroleum residue is achieved by a special catalyst and a double-pipe reactor. A silica alumina carrier containing from 5 to 15 wt% of silicon dioxide is soaked in the water solution of a hydrogenated active metal compound. It is dried and roasted at a temperature higher than 350 C. These spherical catalysts of 0.1 to 3 mm diameters are used in double vertical pipes of the reactor. Heavy petroleum residue and hydrogen gas are passed from the lower center of the reactor. The movement of the petroleum-gas mixture will fluidize the catalyst and the desulfurization reaction is achieved. The oil, gas, and catalyst move upward by the pressure of the newly supplied gas-petroleum mixture, overflow from the inner pipe, and reach the separation area. The catalysts are separated and precipitate through the outer pipe. The lower end of the outer pipe is connected with the lower end of the inner pipe, and thus the catalysts recirculate. Part of the catalysts are continuously taken out from the lower end of the reactor, and new catalysts or reactivated catalysts are continuously supplied at the upper end of the outer pipe. Both desulfurized and incompletely desulfurized oil are taken out from the reactor at the separation area. Incompletely desulfurized oil is returned to the reactor at the lower end. A detailed method of preparing the catalyst is given.

19490 APTIC NO. 37781

Kuzenkov, B. A.

STUDIES ON WET DUST COLLECTORS WITH INTERNAL WATER CIRCULATION. *(Issledovaniye mokrykh pyleuloviteley s vnutrenney tsirkulyatsiyey vody). Text in Russian. Vodosnabzh. i Sanit. Tekhn., vol 11:19-23, March 1972. 3 refs.*

In wet dust collectors with internal water circulation, the water is circulated by the air flow instead of being sprayed. With one baffle partly immersed in water, no stationary air flow conditions can be reached. In Rotoklon N, two curved baffles provide better stationary flow. The distance from the bottom of the baffle to the upper water level is 80 mm. Reduced distances cause both efficiency and resistance to decrease. A water level stabilizer is effective up to a maximum load decrease of 30%. A new dust collector having curved dust collecting water surface and a second straight baffle immersed in water provides even higher stability. Formulae are given for velocity fields, velocity potentials, speed components, and particle trajectories. As a result of studies on flow configurations, equipotentials, flow models, and trajectories, a new PVM type wet dust collector was developed. The water level between the baffles is lower than that outside, with blowers running. Laminary flow is maintained between water surface and baffles. The admitted air flow is deviated by 90 deg. This system is effective within a load variation range of 20-110%. The efficiency for both Rotoklon and PVM was 99%. The latter was stable from a water level of 40 mm, with a resistance of 88 kp/sq m. The water consumption was 0.002 l/cu m with an air temperature of 186 C. The power requirement was 25% lower. It was suitable for medium and finely dispersed dusts in concentrations of 10 and 5 g/cu m, respectively.

19491 APTIC NO. 38194

Lardieri, N. J.

CONTROL OF AIR-BORNE EMISSIONS FROM SULFATE PULPING. *Chem. Eng. Progr. Symp. Ser., 57(35):68-73, 1961. 5 refs.*

Control measures for airborne effluents from kraft cooking and chemical recovery processes are described. At the great majority of kraft pulp mills, the high efficiency of electrostatic precipitators and venturi evaporator-scrubbers is adequate for control of particulates from the recovery furnace or lime kiln. Where it has been necessary to discharge a gas even lower in particulate matter than that produced by the precipitator, several mills have installed wet scrubbers in series with the basic collection unit. These scrubbers are generally the low head loss, fog type. Black liquor oxidation systems, foaming or nonfoaming, are used to reduce the quantities of odorous sulfur gases emitted from pulping and recovery operations. In some existing black liquor oxidation systems, abatement of odors from the digestion phase of pulping is also accomplished as digester relief gases are introduced with air into the oxidation tower and partially oxidized in this manner. Noncondensible digester relief gases and blow gases are collected in a vaporsphere, passed through a rock-packed scrubber, and then burned in a lime kiln. Alternatively the gases can be passed from the vaporsphere to a chlorination washer for complete oxidation of odorous sulfur compounds.

19492 APTIC NO. 38686

Lauderback, William

UNIQUE FLARE SYSTEM RETARDS SMOKE. *Hydrocarbon Process., 51(1): 127-128, Jan. 1972.*

A system that employs finely divided water spray to eliminate smoke from horizontal flares is described. For a system using manual controls, the main items of expense are a water pump and drive, spray nozzles, and related piping. Operating costs are low. Nearly any source of available water which can be pumped through spray nozzles can be used, including industrial waste water. The water can be recirculated and make-up water is needed only for evaporation. By using multiple or variable speed pumps, power consumption can be minimized by pumping only enough water at any time to control smoking. Smoking from heavy flaring from a commerical-size hydrocarbon cracking plant is eleiminated seconds after the water is directed around the flame from a properly designed set of spray nozzles.

19493 APTIC NO. 37774

Lefevre, Harvard S.

GAS DISPERSOID SEPARATOR. *(King Engineering Corp., Ann Arbor, Mich.) U. S. Pat. 3,606,737. 7p., Sept. 21, 1971. 12 refs. (Appl. May 9, 1968, 23 claims).*

A separator utilizing in series a wet coalescing action followed by a dry filtering action to remove the dispersoid is described. It differs from the prior apparatus in that it is particularly suited to much larger gas flow rate applications. The new and improved separator is compact in construction and relatively simple and economical to manufacture and maintain. It utilizes independent wet coalescing and dry filter housings in which the independent housings and their included chambers, as well as the coalescing and filter elements themselves, are of similar construction and interchangeable parts.

19494 APTIC NO. 37874

Lientz, La Clede

BURNER AND METHOD FOR ODOR ELIMINATION. *(Chemetron Corp., Chicago, Ill.) U. S. Pat. 3,619,094. 7p., Nov. 9, 1971. 5 refs. (Appl. May 21, 1969, 4 claims).*

While some available burners will incinerate odors successfully, they do not have the ability to do so at high capacities and temperatures. Problems also arise due to plugging of the fuel nozzle. A burner and a method are presented which can eliminate odorous materials or smoke from an air stream at a high volume. Air containing odorous materials is directed at a high rate and volume around a multiplicity of tubular members having flared or elongated passageways. The odorous air is directed around the ends of the passages by vanes, thus combining with the fuel in the tubular members to incinerate the odorous substances in the air a short distance from the vanes. (Author abstract modified)

19495 APTIC NO. 37992

Linden, A. van der

THE FLUE GAS PROBLEM IN GAS TECHNOLOGY. *(Het afvoer-vraagstuk in de gastechniek). Text in Dutch. Gas, 90(10):363-374, Oct. 1970. 5 refs.*

The increased availability and utilization of natural gas in household and industrial combustion necessitates a closer scrutiny of the question of natural gas combustion effluents. Theoretically, properly burned natural gas should not produce any seriously harmful substances; the principal products of the complete combustion of natural gas are water vapor, carbon dioxide, and heat. Thus, in many cases, special waste gas treatment facilities are not required; simple spacing of outlets, or provision of adequate ventilation in closed spaces, can provide for sufficient dilution of effluents. Larger installations require the construction of flue stacks of appropriate heights and provision of blowers to ensure sufficient dilution of the clean combustion products before they come into contact with any object which might be harmed. Equations are derived for the calculation of the required distance between the flue and the point at which only dilute gas can be tolerated, as a function of combustion quantity, concentration of inert components, air ratio at the outlet, and outlet diameter.

19496 APTIC NO. 38351

Lloyd, William G. and Donald R. Rowe

HOMOGENEOUS CATALYTIC OXIDATION OF CARBON MONOXIDE. *Environ. Sci. Technol., 5(11):1133-1134, Nov. 1971. 11 refs.*

Carbon monoxide in gas mixtures can be rapidly and efficiently oxidized at ambient temperatures to carbon dioxide. An old analytical technique for the assay of CO was adapted to provide a fast catalytic process based on palladium(II)/copper(II). Passage of a test mixture containing 2000 ppm CO through an aqueous solution at ambient temperature in a simple laboratory apparatus affords 97% conversion to CO2. (Author abstract)

19497 APTIC NO. 38586

Loeschau, Siegbert

NEW ANALYTICAL AND TECHNOLOGICAL MEASURES TO DECREASE POLLUTION OF THE BIOSPHERE. THERMAL AND CATALYTIC CLEANING OF WASTE GASES. *(Neue analytische technische und technologische Massnahmen zur Senkung der Verschmutzung der Biosphaere. Thermisch-katalytische Abgasreinigung). Text in German. In: Technik und Umweltschutz Luft-Wasser-Boden-Laerm. Kammer der Technik, Brennstofftechnische Gesellschaft in der Deutschen Demokratischen Republik (ed.), Leipzig, VEB Deutscher Verlag fuer Grundstoffindustrie, 1972, p. 61-74.*

General characteristics of and costs involved in catalytic gas cleaning are discussed. The low-temperature catalytic gas cleaning is only possible in the presence of oxidizable, primarily organic, substances, in the gas. The temperature, normally in the range of 250-350 C, is dependent on the gas to be cleaned. Also excess oxygen is required for catalytic afterburning. Metallic oxides with and without carrier substances, noble metals applied on carrier materials, and noble metals applied on metal carriers are the four different types of catalysts. The catalysts have long life of 10,000 hr, and endure long-time and short-time exposures to 500 and 600 C, respectively, without losses in activity. The gas to be cleaned should be free from dust. In catalytic gas cleaning equipment installed at the Synthesewerk Schwarzheide, the gas to be cleaned had to be heated to a temperature of 320-330 C by means of oil burners. The capacity was 20,000 N cu m of low-concentration gas/hr. The specific costs amounted to 40 cents/1000 N cu m of gas. With a heat content of about 150 kcal/N cu m, a profit of 41 cents M/1000 N cu m could be reached.

19498 APTIC NO. 38471

Lohrberg, Karl and Helmut Schummer

INCREASING THE SEPARATION OF ELECTROSTATIC DUST SEPARATORS. *(Vorrichtung zur Erhoehung des Abscheidegrades von elektrostatischen Staubabscheidern). Text in German. (Metallgesellschaft A. G., Frankfurt (West Germany)) W. Ger. Pat. 1,457,091. 5p., Oct. 7, 1971. 2 refs. (Appl. Sept. 18, 1964, 4 claims).*

An apparatus is described which is used to improve the degree of separation of an electrostatic dust separator employed in metal works that emit stack gases containing sulfur dioxide, and waste gases. The sulfur trioxide used to improve the separation is formed by partial catalytic oxidation of the SO2 present in the crude gas in the gas channel before reaching the dust separator. The catalyst is applied on bearers positioned in the crude gas flow. The contact area of the catalyst is adjustable by means of mechanic drives depending on a value determining the degree of dust separation such as the dust concentration. The catalyst applied is iron oxide or vanadium pentoxide.

19499 APTIC NO. 38302

Longcore, Lawrence A.

GAS SCRUBBER WITH TANGENTIAL WATER INTRODUCTION. *(Arco Industries Corp., Detroit, Mich.) U. S. Pat. 3,620,510. 6p., Nov. 16, 1971. 3 refs. (Appl. Nov. 13, 1968, 9 claims).*

A modified design for a venturi gas scrubber is presented. Previous gas scrubbers have failed to solve the problem of distributing the fluid evenly and completely across the surface of the decreasing conical surface of the venturi scrubber and of maintaining even distribution throughout the operation. This wet-dry-wet condition causes a hardening of the particles and a buildup on the surface of the funnel resulting in the eventual plugging of the scrubber or a change in flow characteristics. The modified design requires the inclusion of a plurality of ledges spiraling downward from an elevated area of the inlet of the venturi with at least one portion of a given ledge overlying a portion of another ledge so that fluid introduced tangentially to the periphery of the venturi near its inlet is evenly distributed across the inner surfaces. The design also includes a funnel-shaped portion with a gas inlet and inner surfaces tapering toward a gas and fluid outlet and a fluid inlet for tangentially introducing fluid into the funnel-shaped part. (Author abstract modified)

19500 APTIC NO. 37989

Loquenz, Heinz, Horst Weber, and Helmut Pfisterer

VENTURI APPARATUS FOR SCRUBBING GAS. *(Waagner-Biro A. G., Vienna (Austria)) U. S. Pat. 3,616,613. 5p., Nov. 2, 1971. 7 refs. (Appl. Sept. 5, 1968, 10 claims).*

Different types of venturi scrubbers are known where the washing liquid is sprayed under pressure into the gas stream. Washing of the gas in this manner has the disadvantages of requiring a large consumption of energy and a large amount of washing liquid. Also, the amount of washing liquid and the size of the cross section of the gas stream are not always adapted to the particular gas throughput. In the present method, upon entry of the gas which is to be cleaned upon the converging portion of the venturi apparatus, there is a liquid supply means which directs a screen of washing liquid which simply falls by gravity across the stream of flowing gas so that the washing liquid is introduced without pressure. At the same time the gas stream, as a result of its kinetic energy, flows through and breaks up the screen of falling washing liquid into fine and very fine droplets which automatically become uniformly distributed across the gas stream to flow with the latter through the venturi throat and then along the diverging venturi portion.

19501 APTIC NO. 37950

Lukas, Wolfgang and Josef Gloger

DEPENDENCE OF THE COLLECTION EFFICIENCY FOR GRAIN SIZE FRACTIONS OF CENTRIFUGAL SEPARATORS ON THE DUST LOAD IN THE UNCLEANED GAS AND ON THE CYCLONE ENTRANCE SPEED. *(Abhaengigkeit der Fraktionsabscheidegrade der Fliehkraftabscheider von der Rohgasstaubbeladung und der Zykloneintrittsgeschwindigkeit). Text in German. Chem. Tech. (Berlin), 23(12):724-727, Dec. 1971. 21 refs.*

A model cyclone, which has been described elsewhere, was used for the experimental study of the dependence of the collection efficiency for certain grain size fractions on the dirt load and the entrance speed. Quartz dust was used for the tests. Dust loads of 5, 25, and 50 g/cu m and entrance speeds of 17.90, 16.85, 13.45, 10.01 and 6.74 m/sec. were selected. The entrance speeds corresponded to a gas throughput of 530, 500, 400, 300 and 200 cu m/h. The collection efficiency for the various grain sizes was determined by comparison of the quartz dust entering the cyclone with the results of analyses of dust samples collected in the bunker after cyclone separation. No great deviation from the grain size distribution in the original dust load entering the cyclone occurred. With higher entrance speeds, the dust collection in the bunker and thus the total collection efficiency increased. For grains 2.5 micron in diameter, however, the collection efficiency dropped with increasing entrance speed. At a dust load of 25 g/cu m, the collection efficiency for the grain size fractions was considerably worse than that achieved with dirt loads of 5 g and 50 g/cu m.

19502 APTIC NO. 38661

Maeda, Isamu

STACK GAS DESULFURIZATION TECHNIQUE. *(Haigasu datsuryu gijutsu). Text in Japanese. Kagaku Sochi (Plant and Process), 13(6):38-45, June 1971. 6 refs.*

As desulfurization by-product recovery products, dilute sulfuric acid and gypsum are discussed. For recovery of dilute sulfuric acid, the activated carbon water scrubbing method (mobile and fixed bed processes), the sulfuric acid method (Lurgi-Appartebau), the Monsanto method, and the Parsons method are discussed. For recovery of gypsum, the lime slurry method, the alkaline double decomposition method, and the lime neutralization method are discussed. The dilute sulfuric recovery processes consists of three stages: adsorption of sulfur dioxide gas, separation of sulfuric acid from the adsorbent, and condensation of dilute sulfuric acid. The characteristics of various processes are as follows: the gas temperature after the treatment is approximately 100 C for the activated carbon method, 93 C for the Monsanto method, and 60 C when using the sulfuric acid method. The problem of sulfuric acid recovery is the material, since it has to be highly resistant to the corrosive action of high temperature sulfuric acid, and the mobile bed activated carbon scrubbing method presents less difficulty than the other methods in this respect. The mobile bed activated carbon method can be installed compactly even when the system itself is enlarged. The fixed bed activated carbon and Monsanto require a large installation space when the system is enlarged. The sulfuric acid method requires a multiple number of small equipment. For recovery of gypsum, the lime slurry method presents a scale trouble; there is less problem with the double decomposition method, and the activated carbon method presents no problem. The double decomposition process wears absorbent and catalyst most rapidly and severely. The wear of activated carbon is less in the fixed bed method than the mobile bed. The installation cost is less for the mobile activated carbon bed than any other methods. The transition of demands for gypsum between 1965 and 1970 is presented in a table.

19503 APTIC NO. 38091

Malov, R. V.

EFFECT OF FILM INJECTION ON DIESEL ENGINE TOXICITY. *(Vliyaniye plenochnogo smeseobrazovaniya na tokichnost dizelya). Text in Russian. Avtomob. Prom., 37(9):9-10, 1971. 3 refs.*

A diesel engine (192 hp at 2100 rpm) operating with film fuel injection produced an exhaust free of carcinogens and with markedly reduced soot content. The solid carbon content in the exhaust did not exceed 0.15-0.16 mg/l and was 10-15 and 5-16 lower than for normal (volume) fuel injection at small and large loads, respectively. Noncarcinogenic hydrocarbon and carbon monoxide emissions were significantly lower, particularly at high loads, than those of a normal fuel injection engine. Exhaust nitrogen oxide concentrations remained high (1.8-2.0 mg/l at maximum load). The overall exhaust volume at maximum load was approximately 10% less than that of normal fuel injection engines.

19504 APTIC NO. 37821

Manary, Otto J., Jr.

GASOLINE FUEL CONTAINING A POLYALKOXYLATED ALKYLPHENOL TO REDUCE EXHAUST EMISSION. *(Dow Chemical Co., Midland, Mich.) U. S. Pat. 3,615,295. 3p., Oct. 26, 1971. 4 refs. (Appl. July 18, 1969, 7 claims).*

The hydrocarbon content in the exhaust gas of an internal combustion engine is maintained at a relatively low level by using a fuel composition containing a small but effective amount of polyalkoxylated alkylphenol. Especially preferred for this purpose are the nonylphenol derivatives, with the ethoxylated nonylphenol compounds containing 2 to 9 ethyleneoxy units. These compounds may be prepared by conventional base-catalyzed oxyalkylation reaction and they are commercially available.

19505 APTIC NO. 37816

Margraf, Adolf

POCKET FILTER FOR PURIFYING DUST-LADEN GASES. *(Assignee not given.) U. S. Pat. 3,605,387. 4p., Sept. 20, 1971. 6 refs. (Appl. Sept. 29, 1969, 9 claims).*

Filters are known comprising filter pockets arranged in parallel relation in the dust-laden compartment of a filter chamber, with the filter surfaces being maintained in spaced relation by inner frames which include a bridging formed by a mat of spiral springs. The frames can be inserted through a door in the side of the purified gas compartment and slots formed in a partition between the dust-laden gas compartment and the purified gas compartment. Such pocket filters are generally adapted for smaller filtering capacities, and the periodically required cleaning of the filter pockets can only be achieved by jarring methods. An improved pocket filter is described which comprises a discharge nozzle for a fully automated cleaning operation and easy maintenance. Drive means pass the nozzle horizontally past the row of filter pockets to remove the dust accumulated there.

19506 APTIC NO. 38559

Marsh, Robert Claude and James Edward Woods

CLEAN AIR TARGET DEVICE. *(Becton, Dickinson and Co., East Rutherford, N. J.) U. S. Pat. 3,629,999. 7p., Dec. 28, 1971. 12 refs. (Appl. Aug. 20, 1969, 5 claims).*

A unit for providing particulate control is described which comprises a means for generating airflow, means for effecting a substantially contaminant-free conditioning of the airflow, an annular diffuser, and an air plenum capable of directing the conditioned airflow against the outer surface of the diffuser. The diffuser has a radially projecting lip on the superior edge of the inner periphery of the diffuser, to protect an object placed within the well of the diffuser from internal and external contamination by a vertically flowing barrier. Previous devices to provide a clean atmosphere for small target areas were not suitable for small applications since they were expensive, unwieldy, and impractical for so small an area. (Author abstract modified)

19507 APTIC NO. 37883

Martois, Arthur E.

GAS BURNER FOR FUMES AND THE LIKE. *(Assignee not given.) U. S. Pat. 3,615,249. 3p., Oct. 26, 1971. 2 refs. (Appl. April 22, 1970, 5 claims).*

A gas burner is described for mixing combustible industrial noxious fumes and vapors with gases and air for combustion in a furnace to thus reduce air pollution. The metal portions of the burner are constructed so that they will quickly burn out due to high temperatures within the furnace, and also so that these metal parts will be protected with a ceramic shield or blocks to prevent damage to the burners. The fuel burner is shaped so that the force of the combustible gas and the air will draw adjacent noxious fumes through the loop, thus providing a more effective and complete mixture of fumes, air, and gas. (Author abstract modified)

19508 APTIC NO. 37962

Marzluff, William Frank

PROCESS FOR PURIFYING AIR. *(American Cyanamid Co., Inc., Stamford, Conn.) U. S. Pat. 3,616,339. 6p., Oct. 26, 1971. 9 refs. (Appl. Oct. 17, 1969, 14 claims).*

An electrochemical method is presented which avoids the deficiencies in existing air purification techniques by remaining economical and efficient, despite temperature and humidity variations. Oxidizable gas impurities in air are removed at the anode of a powered electrochemical cell which comprises an air cathode, a matrix electrolyte, and an anode having a surface of lead dioxide or other metal or metal oxide in direct contact with the impinging impure air and in electrical contact with the electrolyte. The impurities, including amines, esters, mercaptans, sulfides, aldehydes, ketones, alcohols, organic acids, aromatic and unsaturated hydrocarbons, odors from tobacco smoking, sulfur oxides, cooking odors, and metabolic odors, are substantially absorbed and subsequently oxidized to innocuous products. (Author abstract modified)

19509 APTIC NO. 38593

Massonne Joachim

STATE OF THE ART AND DEVELOPMENT OF INDUSTRIAL FLUORINE CHEMISTRY. *(Stand und Entwicklung der industriellen Fluorochemie). Text in German. Chemiker Z. (Heidelberg), 96(2):65-75, Feb. 1972. 79 refs.*

Electrolytic aluminum production is by far the largest consumer of inorganic fluorine compounds. In 1970, the Federal Rupublic of Germany produced 309,000 t of aluminum for which 9000 t of AlF_3 and 8000 t of Na_3AlF_6 were used. Despite the present stagnation of aluminum consumption, considerable capacity increases are expected for Europe and Japan. For reducing fluorine emissions by these plants, expensive waste cleaning facilities are installed. An aluminum plant producing 100,000 tons of aluminum/annum, 5 to 6 t of HF are emitted daily in addition to considerable quantities of dust; at the Soederberg anodes, tar vapors, soot particles, and sulfur dioxide are emitted. In the so-called open furnaces (e.g., Alsuisse), type the waste gases are passed through rooftop scrubbers prior to discharge; 50% of the dust and 90% of the F are removed. The uncleaned gas usually arrives at the scrubber with 5 mg F/cu m. In furnaces with Soederberg anodes, the waste gases are collected and burned to eliminate tar vapors. They are then passed to cyclones or electrostatic precipitators for dust separation and to the scrubber for washing out the gaseous fluorine compounds. A dry method for cleaning such gases has recently been introduced wherein the waste gas is treated with Al203. Dust and HF are retained. The HF and dust-laden clay then goes to an electrolytic bath. The method is disadvantageous in that the solid residues must be dumped.

19510 APTIC NO. 38352

Matsuzawa, Kenji

DEVICE FOR AUTOMOBILES FOR PREVENTING AIR CONTAMINATION. *(Nissan Jidosha Kabushiki Kaisha, Yokohama (Japan)) U. S. Pat. 3,628,328. 9p., Dec. 21, 1971. 1 ref. (Appl. Dec. 2, 1968, 1 claim).*

A method is described for the control of automobile emissions by forcing compressed air to an engine exhaust manifold for reburning the incompletely burned components of the engine exhaust gas. The device comprises an air pump portion and an alternator portion connected in series along a common shaft. The air pump delivers compressed air generated into the alternator for cooling. The compressed air, which is heated by cooling the alternator, is forced into the engine exhaust manifold for effectively reburning the incompletely burned components. The present method obviates the power wasted in previous methods which utilized fans for cooling the alternator. (Author abstract modified)

19511 APTIC NO. 38305

Matthys, W. J. and R. C. Lutwen

ECONOMICS OF FIRING FCCU OFF-GASES AS BOILER FUEL. *Hydrocarbon News, 43(11):24-26, Nov. 1971.*

By burning low heating value catalytic regenerator gases in a steam generator, a reliable source of steam for power and process is provided to the petroleum refining and petrochemical processing industry while the carbon monoxide and hydrocarbons in the gases are oxidized. The fuel savings represented by recovery of this energy as steam will provide a pay out period of 2-3 yrs depending on the heat available in the gas stream. Emission of pollutants is controlled by burning CO and hydrocarbons to carbon dioxide and water and by mechanical or electrostatic collection of solid particles. Design criteria and cost estimations for a typical CO-fired boiler are presented.

19512 APTIC NO. 37770

McCreath, C. G.

THE EFFECT OF FUEL ADDITIVES ON THE EXHAUST EMISSIONS FROM DIESEL ENGINES. *Combustion Flame, 17(3):359-366, Dec. 1971. 17 refs.*

An investigation was made into the effects of various quantities of different additives on the total amount of nitrogen oxides, carbonyl compounds, and carbon monoxide of the exhaust products emanating from a working diesel engine. Freshly prepared additives which are capable of generating alkoxyl radicals under engine operating conditions can reduce ignition delay. Freshly prepared additives which are not capable of generating alkoxyl radicals under engine operating conditions do not reduce ignition delay and can even increase it. If the ignition delay is reduced, the nitrogen oxides content of the exhaust products is also reduced. Only those freshly prepared additives which reduce the ignition delay under engine operating conditions significantly increase the carbonyl compound content of the exhaust products. All the freshly prepared additives investigated increase the carbon monoxide content of the exhaust products. Nitromethane, isoamyl nitrate, and ditertiary butyl peroxide can be subject to aging in solution with fuel after which they are capable of reducing the nitrogen oxides, carbon monoxide, and carbonyl content of the exhaust products below the level obtained when fuel alone is used. (Author conclusions modified)

19513 APTIC NO. 37876

McKay, Lester M.

METHOD FOR REMOVING POLLUTANTS FROM THE ATMOSPHERE. *(Assignee not given.) U. S. Pat. 3,619,980. 3p., Nov. 16, 1971. 3 refs. (Appl. Aug. 19, 1968, 5 claims).*

It is now apparent that the problem of a polluted atmosphere caused by a temperature inversion cannot be solved by attempting to limit the quantity of pollutants discharged to the atmosphere. In time even a reduced amount of pollutants will accumulate until they contaminate the atmosphere and render it dangerous to health. A method is described of removing pollutants from the atmosphere using the storm drains and/or sewer systems of a city. The downward pressure of a temperature inversion is used to cause the lower layer of the atmosphere to flow to catch basins or other openings in the drains and sewer systems. A series of low powered fans or water flow in the sewer will create a steady horizontal flow of air through the drains and sewer system. After being removed by the sewer system, the gases are cleaned by passage through water and through a filter. The gases can then be recovered and sold as by-products. (Author abstract modified)

19514 APTIC NO. 38083

McMillan, Donald

PROCESS FOR REDUCTION OF SULFUR DIOXIDE WITH HYDROCARBON VAPOR. *(Dupont de Nemours (E. I.) and Co., Wilmington, Del.) U. S. Pat. 3,615,221. 6p., Oct. 26, 1971. 6 refs. (Appl. April 21, 1969, 7 claims).*

A process for the reduction of sulfur dioxide with hydrocarbon vapor is presented. A prior process had two major disadvantages, i.e., that in preheating the SO2 to a temperature suitable for reduction corrosion problems were incurred, and that the process did not utilize all of its starting materials. The present process avoids corrosion problems in the preheating stage, provides a means of delivering an SO2-HC vapor mixture at a constant temperature within the range 650-1050 C to a converter zone, and allows proper adjustment of the converter operating temperature to obtain substantially complete utilization of the hydrocarbon vapor used. The reduction of SO2 to hydrogen sulfide and sulfur is accomplished by mixing the SO2 with a hydrocarbon vapor, preheating the mixture to 500-560 C, mixing the preheated material with the combustion products of the HC, converting a portion of the SO2 to H2S and sulfur, and cooling the converted material.

19515 APTIC NO. 38069

Meacham, George B. K. and James L. Oliver

EMISSION CONTROL DEVICE. *(Eaton Yale and Towne Inc., Cleveland, Ohio) U. S. Pat. 3,626,720. 7p., Dec. 14, 1971. 5 refs. (Appl. Dec. 19, 1968, 10 claims).*

A mechanism is presented for varying the phase relationship of a camshaft with respect to the crankshaft. A driven member is secured in fixed relationship to the camshaft and is connected through a helical ball spline to a piston member which is nonrotatably related to the crankshaft. The piston member and the driven member define a fluid chamber. A shiftable valve member permits flow of fluid to the chamber causing the piston to move axially relative to the driven member, whereby the helical ball spline causes the driven member to rotate relative to the piston, which in turn causes rotation of the camshaft relative to the crankshaft. The valve member may be controlled either manually or automatically in response to engine operating conditions. While prior devices were able to vary the phase relationship between the camshaft and the crankshaft, the devices did not permit variations of the phase relationship with sufficient accuracy to insure precise control over the adjustment of the camshaft to permit maximum reduction in the emission of noxious exhaust gases. (Author abstract modified)

19516 APTIC NO. 38473

Meedom, H.

THE NEW UNAX COOLER. *(Der neue Unax-Kuehler). Text in German. Zement-Kalk-Gips (Wiesbaden), 60(12):560-563, 1971. (Presented at the VDZ-Kongress, Verfahrenstechnik der Zementherstellung, Duesseldorf, W. Germany. Sept. 28,-Oct. 1, 1971.)*

The new Unax cooler is capable of cooling cement clinker to 120- 150 C. with an efficiency of approximately 66% when operating with dry-process kilns and about 73% with wet-process kilns. Although the cooler discharges almost all its dust output into the kiln, there is no additional load on the electrostatic precipitator for the kiln exit gas. The fully automatic Unax cooler requires a power consumption of 0.5 kWh per ton of clinker when used with a fairly small kiln, and up to 1.3 kWh/ton when used with the largest kilns.

19517 APTIC NO. 37986

Meyer-Koenig, Walter and Carl Ernst

THE MICROSCREEN AND OZONE PLANT OF THE WATER SUPPLY, LAKE CONSTANCE. *(Die Mikrosieb- und Ozonanlage der Bodensee- Wasserversorgung). Text in German. Gas- Wasserfach, Wasser- Abwasser, 113(1):25-34, Jan. 1972.*

The water cleaning plant for the lake of Constance has been completed by a microscreen device in order to remove plankton and by an ozonizing device in order to decolorate the water and to improve its taste and odor. Since the waste gas from the ozonizing device still contains ozone, it is led through activated carbon. The equipment consists of two carbon filters of a diameter of 1.8 m and a length of 2 m containing 3 cu m of activated carbon each. Only one of the filters is in operation. As the activated carbon is consumed by the oxidation effect of the ozone, its capacity is continuously controlled. If the capacity of the filter decreases, the first filter is put out of operation and the second one starts to work. In order to avoid the danger of explosion which would be caused by a content of more than 20 g of ozone/cu m of air, an automatic control is provided which stops the whole ozonizing plant at 2.5 ozone/N cu m.

19518 APTIC NO. 38211

Meyers, Robert A.

PROCESS FOR REMOVING SULFUR OXIDES FROM GASEOUS MIXTURES. *(TRW Inc., Redondo Beach, Calif.) U. S. Pat. 3,607,002. 4p., Sept. 21, 1971. 3 refs. (Appl. Aug. 2, 1968, 2 claims).*

A method is described for the removal of sulfur dioxide and sulfur trioxide from hot gases by using solid organic absorbents characterized as having a high thermal stability at emission gas temperatures. The solid absorbents are selected from the group consisting of aniline blacks, e.g., nigrosine, copper phthalocyanine, pyrolyzed polyacrylonitrile, and pyrolyzed polyvinylchloride. The use of liquid phase absorption techniques were not completely satisfactory in that the liquid functions as a coolant, thereby increasing the density of the gas which caused the cooler gas to settle in the vicinity of the stack. While many organic materials have comparatively high melting points and good thermal stability, they were not satisfactory with respect to their absorbing and regenerating characteristics to be commercially useful as absorbents for sulfur oxide gases. (Author abstract modified)

19519 APTIC NO. 38558

Meyers, Robert A., John S. Land, Christopher C. Shih, and Jerry L. Lewis

CELLULOSICS FOR THE REMOVAL OF SULFUR DIOXIDE FROM FLUE GAS STREAMS. *(TRW Inc., Redondo Beach, Calif.) U. S. Pat. 3,629,996. 5p., Dec. 28, 1971. 4 refs. (Appl. Feb. 19, 1970, 7 claims).*

Sulfur dioxide contained in flue gases from a coal-burning, thermal generating plant can be sorbed on finely divided cellulose such as shredded paper at temperatures between 215 and 300 F. After the cellulose has been saturated with the SO2, it is desorbed by flue gas at about 350-450 F. The desorbed SO2 may be then conveniently forwarded to a plant for processing to sulfuric acid. Spent cellulose may be forwarded to the plant for burning or it may be further digested to carbohydrates. (Author abstract modified)

19520 APTIC NO. 37839

Miller, Leo A. and James A. Taylor

PROCESS FOR RFCOVERING SULFUR DIOXIDE FROM AN SULFUR DIOXIDE- CONTAINING GAS. *(Wellman-Lord, Inc., Lakeland, Fla.) U. S. Pat. 3,607,039. 5p., Sept. 21, 1971. 3 refs. (Appl. Dec. 24, 1968, 11 claims).*

An improvement in the process for recovering sulfur dioxide by reacting the SO2-containing waste gases with an aqueous solution of a metal sulfite to produce the corresponding bisulfite is described. Potassium, cesium, or rubidium are recommended for the metal sulfite. The bisulfite is recovered by transforming it into the corresponding pyrosulfite and then treating the pyrosulfite to produce SO2. In the present process, the metal bisulfite is recovered and transformed into the metal pyrosulfite by contacting the precursor-containing solution with an organic carbonyl compound to form a metastable adduct of the metal bisulfite and the carbonyl compound. The adduct is insoluble in the aqueous solution and therefore precipitates out. The separated precipitate is heated to a temperature sufficient to decompose the adduct to the metal pyrosulfite but below the temperature at which the pyrosulfite decomposes. (Author abstract modified)

19521 APTIC NO. 37905

Milner, Maclin R. and Frederick B. Johnston

COMBUSTION ADJUVANT. *(Trimex Corp., Clearwater, Fla.) U. S. Pat. 3,630,696. 4p., Dec. 28, 1971. 6 refs. (Appl. Oct. 27, 1969, 12 claims).*

A technique to enhance the completeness of combustion, minimize formation of tray and carbonaceous residues on boiler tubes, prevent deposition of molten mineral slag on the metal surfaces, and reduce the relative amounts of pollutants in the products of hydrocarbon fuel combustion is presented. The adjuvant for hydrocarbon fuels comprises a calcium based montmorillonite clay, a phosphate, and a source of boron oxide. A preferred formulation by weight is 85% calcium bentonite, 10% anhydrous trisodium phosphate, and 5% sodium borate. The adjuvant is combinated with the hydrocarbon fuel or with combustion air in an amount of about 1.1-2.0%, based on the weight of the fuel. Combustion efficiency is substantially improved and oxidation is more complete, so that combustion products are less noxious. The nature of slag and other deposits on furnace or combustion chamber surfaces is altered, preventing corrosion, and the deposition of slag is reduced; the ash is produced in a soft friable form. Current methods to reduce deposits by blowers and scrapers are not completely effective and can cause thermal shock damage and cracking of tubing due to water washing. (Author abstract modified)

19522 APTIC NO. 38088

Minifie, F. G. and A. J. Moyes

LOW COST ELECTROSTATIC PRECIPITATION. *Filtration Separation (Purley), 9(1):52-59, Jan./Feb. 1972. (Presented at the Filtration Society Conference on Filtra-*

tion in Process Design and Development, London, England, Sept. 28-30, 1971.)

Techniques for the control of dust emissions from stack gases are compared and contrasted. Design criteria, operating procedures, efficiency, and costs are examined for the positive fabric filter, inertial separators, i.e., cyclones and venturi scrubbers, and the electrostatic precipitator. The mechanism of electrofiltration and methods to minimize capital and operating costs are considered. Both the fabric filter and the electrostatic precipitator are easily able to collect fine dusts. The electrostatic precipitator involves a higher capital cost than the other two dust collectors, but is cheapest in the long run (e.g., over five years).

19523 APTIC NO. 38713

Montzka, Manfred

PROCEDURE AND DEVICE FOR REMOVAL OF CHLORINE AND HYDROGEN CHLORIDE FROM HOT COMBUSTION GASES. *(Verfahren und Vorrichtung zum Entfernen von Chlor und Chlorwasserstoff aus heissen Verbrennungsgasen). Text in German. (Deutsche Richard Kablitz Gesellschaft fuer Oekonomie der Dampferzeugungskosten, Lauda Baden (West Germany) und Feuerungskontrolle Richard Kablitz G.m.b.H. und Co. KG, Lauda/Baden (West Germany)) W. Ger. Pat. Appl. 2,015,996. 8p., March 26, 1970. (7 claims).*

The design and apparatus for a process for the removal of chlorine and hydrogen chloride from hot combustion gases to prevent corrosion of incinerators which burn plastic refuse are presented. The hot gases are passed through a layer of iron turnings where iron chlorides are formed for subsequent filtration from the gas by scrubbers or electrostatic precipitators after cooling. Previous measures for the prevention of corrosion have consisted of limiting temperatures to 250 C by operating at low pressure in steam boilers. These processes, however, did not achieve total escape from corrosion by chlorine.

19524 APTIC NO. 38272

Moritz, Karsten H. and Robert C. W. Welch

RESIDUUM HYDRODESULFURIZATION. *(Esso Research and Engineering Co., Baton Rouge, La.) U. S. Pat. 3,617,525. 5p., Nov. 2, 1971. 5 refs. (Appl. April 3, 1969, 5 claims).*

A method of maintaining catalyst activity in the hydrodesulfurization of hydrocarbon residua is described. The residuum is desulfurized by first separating it into a gas oil fraction and a heavy residual fraction. The gas oil fraction is desulfurized in the presence of hydrogen. The desulfurized gas oil is combined with the heavy residual fraction and the mixture is hydrodesulfurized. Dilution of the vacuum residuum with the desulfurized gas oil increases catalyst life and requires a smaller reactor volume. (Author abstract modified)

19525 APTIC NO. 38195

Mueller, James H.

FUME AND ODOR CONTROL SYSTEMS COMPARED AND ANALYZED. *Wood Wood Prod., 76(3):48-50, March 1971.*

A common problem in the wood products industry is the control of fumes and odors produced by veneer dryers, paint spray booths, gluing operations, and finishing lines. The three basic types of control equipment that will meet or exceed pollution control regulations are the afterburner, the afterburner plus heat exchanger, and the thermal regenerative air purification system (TRAPS). The three systems, each of which heats process exhaust to 1400 F for 1/2 sec. are compared with respect to size, capacity, nitrogen oxides production, equipment costs, and annual costs. While the initial cost of the TRAPS system is high, this system has the lowest annual cost, including annual fuel cost, and the lowest rate of nitrogen oxides production. Thermal recovery efficiency of the system is 75%, versus 40% for the afterburner with heat recovery.

19526 APTIC NO. 38371

Muermann, Herbert

DRAWING OFF AND SEPARATING GASES AND VAPORS. *(Absaugung und Abscheidung von Gasen und Daempfen). Text in German. Wasser Luft Betrieb, 16(2):47-52, Feb. 1972.*

Almost complete drawing-off of gases and vapors depends on the performance of the exhaust fan, the exhaust hoods, and the pipe system. Axial and radial exhaust fans are available. Recently, roof fans have also come into use. The extent to which the developing gases and vapors are drawn-off from the point of origin depends on the design of the fan hoods. The best results are achieved by the entire encapsulation of the point of gas or vapor development and maintenance of a slight underpressure. Various types of hoods are available, such as slotted, U-shaped, and funnel-shaped hoods. The pipe system for the drawn-off gases and vapors must be designed to maintain a uniform flow speed throughout the system. Usually a speed between 12 to 18 m/sec is selected. For the separation of acids, scrubbers are used which mostly consist of a round container of synthetic material which operates on the gas-liquid counter-current principle. The dirty gas enters at the bottom and passes three sets of nozzles as well as two packed layers. For separation of oil mists, smoke, vapors, and fine suspended particles, an electric vapor separator is used. It comprises preliminary filter cells, an ionizer, collection cells, and a ventilator.

19527 APTIC NO. 38560

Mullings, Donald M.

ELECTROSTATIC AIR CLEANER. *(General Electric Co., Philadelphia, Pa.) U. S. Pat. 3,630,000. 6p., Dec. 28, 1971. 13 refs. (Appl. Nov. 28, 1969, 1 claim).*

An electrostatic air cleaner is presented which has a deenergizing or grounding device operative upon opening of a closure member to ground electrical components within the cleaner cabinet. The device includes at least two spaced contacts and a bridging element. One of the contacts is connected to the grounding device and the other to a component within the cabinet. A spring is provided to bring the bridging element toward engagement with both contacts. An operator connected to the bridging element forces the bridging element out of engagement with the contacts when the closure member engages the operator upon closing of the closure member. The operator is resilient to compensate for variances but is less resilient than the spring in order to overcome the spring. (Author abstract modified)

19528 APTIC NO. 38158

Nagl, Gary J.

CATALYST COMPOSITION AND HYDRODESULFURIZATION WITH AN EXTRUDED COMPOSITE CONTAINING ALUMINA, GROUP VI-B METAL AND ZINC COMPONENT. *(Universal Oil Products Co., Des Plaines, Ill.) U. S. Pat. 3,627,674. 5p., Dec. 14, 1971. 12 refs. (Appl. Nov. 6, 1969, 8 claims).*

An improved process is presented for desulfurizing a sulfurous hydrocarbon charge stock, utilizing a coextruded catalytic composite of an alumina-containing carrier material, a Group VI-B metal component, and a zinc component. The hydrorefining conditions include a maximum catalyst bed temperature of 200-900 F, a pressure in the range of about 400-5000 psig, and a hydrogen circulation rate of about 1000-50,000 scf/bbl. The coextruded composite should contain about 4.0-30.0% by weight of the Group VI-B metal component and from about 1.0-10.0% by weight of the zinc component.

19529 APTIC NO. 38155

Nakajima, Yasuo and Yoshimasa Hayashi

VEHICULAR AIR-POLLUTION PREVENTIVE SYSTEM. *(Nissan Motor Co., Ltd., Yokohama (Japan)) U. S. Pat. 3,605,709. 8p., Sept. 20, 1971. 3 refs. (Appl. March 11, 1970, 5 claims).*

A system is presented for reducing the quantity of nitrogen oxides emitted from internal combustion engines when the motor vehicle is driven in urban areas. The system is constructed and arranged to have the exhaust gases recirculated into the intake manifold only when the motor vehicle is accelerated or climbs up a hill at a speed within a predetermined range. An exhaust gas recirculation control valve assembly is adapted to pass the exhaust gases to the intake manifold when both of two switches are closed concurrently. Previous methods involved continuous recirculation of exhaust gases without respect to the operating conditions of the engine.

19530 APTIC NO. 38312

Nakajima, Yasuo

VEHICULAR AIR-POLLUTION PREVENTIVE SYSTEM. *(Nissan Motor Co., Ltd., Yokohama (Japan)) U. S. Pat. 3,626,915. 13p., Dec. 14, 1971. 2 refs. (Appl. March 6, 1970, 11 claims)*

The design for an automotive exhaust control system adapted to reduce the quantity of toxic nitrogen oxides in the engine exhaust gases is presented. Previous processes for the control of Nox emissions through recirculation of the exhaust gases to the intake manifold still encountered problems with the contamination of engine components due to lead, carbon, and moisture content. The present control system for use with an internal combustion engine has switches which close when the vehicle is driven under predetermined conditions providing the acceleration or hill climbing and a solenoid valve adapted to pass atmospheric air to the intake manifold to make lean the air-fuel mixture in the engine combustion chamber when the switches are closed concurrently. The conditions for concurrent closing of the switches are determined by variables such as the combustion of intake manifold vacuum and engine speed and of vehicle speed and angular position of the carburetor throttle valve. The air to be admixed to the air-fuel mixture may be heated before it is drawn into the combustion chamber. (Author abstract modified)

19531 APTIC NO. 38297

Nashen, Gerd and Johannes Knappstein

POLLUTION-FREE DISCHARGING AND QUENCHING APPARATUS. *(Firma Carla Still, Recklinghausen (West Germany)) U. S. Pat. 3,630,852. 9p., Dec. 28, 1971. 2 refs. (Appl. July 18, 1969, 10 claims).*

A modification with regard to the construction of coking furnaces, in particular a new device to ensure emission-free discharge and quenching of coke in horizontal coke furnace batteries, is presented. Previous methods were not effective, since the transportation of hot coke in a open quencher car was not avoided and gases were emitted in the process; wet quenching in closed tanks also caused corrosion problems. The modified construction includes a closed coke-receiving chamber equipped with gas and dust exhaust devices. The chamber extends over the entire length of the coke battery and encloses the doors to the individual furnace chambers. The receiving chamber is connected with a quenching tower to which the coke is transported on a conveyor. The quenching tower itself includes either an arrangement of sprays directed over the conveyor or a quenching pool into which the coke is delivered; the quenched coal is then conveyed into a receiving bin at the exterior of the tower. (Author abstract modified)

19532 APTIC NO. 38103

Nazarov, B. G., V. A. Pinaev, L. A. Degtyareva, and V. I. Budanov

PURIFICATION OF WASTE GASES FROM THE PRODUCTION OF SULFUR DIOXIDE BY THE LIME SUSPENSION METHOD. *(Ochistka dymovykh gazov ot sernistogo angidrida izvestnyakovoy suspenziyey). Text in Russian. Khim. Prom. (Moscow), 47(10):763-765, 1971. 2 refs.*

The use of venturi scrubbers with a 65% limestone suspension to remove sulfur dioxide from stack gases is reviewed. Feed SO2 concentration was 0.402-0.494% by volume; maximum purification efficiency was 83%. The separation efficiency increased linearly with the liquid rate and decreased with gas velocity in the venturi tube constriction. Liquid rates ranged within 2.1-9.7 l/cu m; pressure drops were within 150-410 mm of water. Two linear gas velocities in the venturi tube constriction were used, i.e., 32.4 and 26.8 m/sec. Mass transfer coefficients were determined at 2680-6160 kg/cu m atm hr.

19533 APTIC NO. 37836

Neill, Scott E., Jr.

FILTER CLEANING PROCESS AND APPARATUSES. *(Assignee not given.) U. S. Pat. 3,608,567. 15p., Sept. 28, 1971. 12 refs. (Appl. June 26, 1970, 3 claims).*

Cleansing of automotive air filters usually has been attempted by hand-held rapping and/or forceful brief air blasts with hand manipulation of the air filter. Such air blasts are frequently so violent as to rupture the filter element, and the use of air blasts with rapping only serve to dislodge the most loosely held material. A solution to the problem of cleaning the outer surface of a filter wall is provided, by furnishing mechanical support to the inner surface of the thin wall and then applying a liquid jet of sufficient force to remove the dirt and debris without causing any damage to the wall.

19534 APTIC NO. 37804

Nesbitt, John D. and Klaus H. Hemsath

APPARATUS FOR TREATING GASES. *(Midland-Ross Corp., Toledo, Ohio) U. S. Pat. 3,607,119. 5p., Sept. 21, 1971. 5 refs. (Appl. Sept. 30, 1969, 9 claims).*

A combustion apparatus for thermally treating gases which are difficult to handle by mechanical compressors or pumps is presented. The apparatus comprises an internal combustion burner capable of producing a high-temperature and high-velocity jet stream of gases which is directed into an adjacent coaxially aligned chamber where it entrains, mixes with, and propels the low-velocity fumes which have entered through an inlet in the chamber and which are to be treated. The resultant gas stream is propelled through a constricting outlet section of the chamber having a cylindrical throat coaxially aligned with the jet stream. The relative location and size of the throat section are established so that the natural dispersion angle of the jet stream intersects the chamber walls adjacent the inlet end of the throat section or between the inlet and outlet ends of the throat section. A treating chamber is adjacent to the outlet of the throat section. This invention has been applied to the incineration of fumes from various industrial processes including wire-coating operations.

19535 APTIC NO. 37870

Neumann, Gerhard Max

AUTOMATIC ROLLER BAND AIR FILTER ASSEMBLY. *(Delbag-Luftfilter GmbH, Berlin (Germany)) U. S. Pat. 3,611,677. 6p., Oct. 12, 1971. 6 refs. (Appl. Nov. 13, 1968, 5 claims).*

In automatic roller band filter assemblies for filtering air, the filter band preferably passes from one bobbin in an upper portion of the assembly through an intermediate sealed filter portion to a driven bobbin in a lower portion of the assembly, with separate adjustable deflecting units in the upper and lower portions. The deflecting means serve as a guide and support means for the filter band as it travels across the intermediate portion of the filter. The bottom, center, and upper portions are comprised of prefabricated components, which are usually assembled on site and built into an opening in a wall or into a ventilating duct. (Author abstract modified)

19536 APTIC NO. 38677

Neumann, Gerhard Max

PLATE-SHAPED DISPOSABLE ACTIVE CHARCOAL FILTER. *(Delbag-Luftfilter G.m.b.H., Berlin (West Germany)) U. S. Pat. 3,630,007. 5p., Dec. 28, 1971. 3 refs. (Appl. March 26, 1969, 4 claims).*

A disposable active charcoal filter for eliminating odorous substances from flowing gases is presented which is subdivided into a plurality of compartments by intersecting partitions and has a frame open at both sides. The two open sides are covered by gas-permeable sheets and the space between the sheets is filled with active carbon. This arrangement avoids the disadvantageous effect of settling of the active charcoal on filter efficiency. (Author abstract modified)

19537 APTIC NO. 38047

Newbold, Robert M.

APPARATUS FOR REMOVING AIR POLLUTANTS FROM THE EXHAUST STREAM OF A COMBUSTION PROCESS. *(Assignee not given.) U. S. Pat. 3,620,008. 4p., Nov. 16, 1971. 6 refs. (Appl. July 23, 1970, 12 claims).*

An apparatus for removing pollutants from a combustion exhaust stream is described. It comprises a chamber having an inlet for receiving the exhaust stream, lined with heat resistant material and surrounded by electrical means providing a high frequency electrical field that produces an ignition plasma reaction to ionize the gases in the exhaust stream. The plasma of ionized gases within the chamber is at a high temperature and free from air polluting compounds which are consumed or dissociated. Near the exit of the chamber the ionized gases are cooled and recombined to form harmless compounds such as nitrogen and oxygen. In an automobile installation the high frequency electrical power is provided through a closed system from a standard battery and heat removed from the ionized gases is used for auxiliary power. (Author abstract modified)

19538 APTIC NO. 38087

Ojala, William K.

EXHAUST GAS RECIRCULATION CONTROL VALVE. *(Ford Motor Co., Dearborn, Mich.) U. S. Pat. 3,621,825. 3p., Nov. 23, 1971. 2 refs. (Appl. July 27, 1970, 8 claims).*

Recirculating small quantities of the exhaust gases of internal combustion engines significantly reduces the gases emitted to the atmosphere. The quantity of gases being recirculated seriously affects engine operation, however, particularly during certain modes of engine operation. In previous systems, several individual mechanisms were required to provide overall control of recirculation during all phases of engine operation, and the corrosive nature and high temperature of the exhaust gases reduced the useful life of the components making up the recirculation system. In the present method, exhaust gases are inducted back into the intake manifold in quantities controlled by an integral valve mechanism responsive to throttle blade opening and intake manifold pressure. A heat exchanger built into the valve mechanism reduces the temperature of the recirculating exhaust gases to provide further reductions in oxides of nitrogen. (Author abstract modified)

19539 APTIC NO. 38532

Oshiro, Yoshitaka

NITROGEN OXIDES ABATEMENT APPARATUS FOR INTERNAL COMBUSTION ENGINE EXHAUST. *(Nainen kikan no haiki-chu no chisso sankabutsu gensho sochi). Text in Japanese. (Nissan Automobile Co., Ltd. (Japan)) Japan. Pat. Sho 47-1138. 3p., Jan 12, 1972. (Appl. April 30, 1969, 1 claim).*

The purpose of the invention is to increase the pressure in the exhaust pipe when the engine s load is high so that the inactive gas will accumulate and decrease the combustion temperature and the amount of nitrogen oxides in the exhaust gas. The suction load is detected by a diaphram connected with the suction pipe. The increase of pressure in the exhaust pipe is detected by a valve controlling the exhaust passage, and the valve is operated by the position of the diaphram. A bearing on the wall of the exhaust pipe is connected with the diaphram and controls the exhaust passage by a valve. While the engine is operating at a normal speed, the suction pipe passage creates a high load, and it draws in the diaphram by means of a connector and a pipe. The change in the diaphram position moves the balance weight and the wire which connect the bearing and the diaphram. The bearing rotates and moves the valve. The valve opens the exhaust passage and the gas is emitted. When the pressure in the suction pipe approaches the atmospheric pressure, it changes the position of the diaphram. The valve moves back and closes the exhaust passage partially. The gas accumulates and increases the pressure in the passage and the inactive gas remains in the combustion chamber, causing the temperature to drop. This reduces the amount of nitrogen oxide formation. But the temperature of the exhaust gas in the exhaust pipe does not drop because it is closed, and nitrogen oxides decompose.

19540 APTIC NO. 38369

Ott, R.

METHOD FOR DRY CLEANING OF HOT GASES. *(Verfahren zur Trockenreinigung von heissen Gasen). Text in German. Wasser Luft Betrieb, 16(2):61-62, Feb. 1972.*

A method for the dry cleaning of hot (up to 500 C) gases has been developed which has proved its efficiency in practice for years. Waste gases from a carbide furnace heavily loaded with dust are cleaned to a residual dust concentration of 10 mg/cu m. The dust-laden gas enters at the lower section of the filter which holds five to ten filter chambers. These chambers have a dirty gas section and a clean gas section. The dirty gas chambers are separated from each other by sheet steel plates with the exception of a narrow gas outlet. Filter cartridges protrude into the dirty gas chambers. They consist of seven to eight ceramic cylinders pulled over a perforated tube. Each filter chamber has 98 cartridges with 756 ceramic cylinders. The gas is drawn through the walls of the ceramic cylinders. The dust is retained in the pores of the ceramic material. The cleaned gas from the clean gas chambers flows via a gas heat exchanger and a water cooler to the blower. Further dust and condensating components of the gas flow are separated by the cooling of the gas. A pressurized air flow, which is branched off from the cleaned gas flow, is used for cleaning the ceramic bodies. The cleaning of one chamber takes 20 sec. The pressure of the cleaning gas is 800 to 1000 mm water.

19541 APTIC NO. 38678

Palm, J. W.

WATCH THESE TRENDS IN SULFUR PLANT DESIGN. *Hydrocarbon Process., 51(3):105-108, March 1972. 12 refs.*

Interest in recovery of sulfur from hydrogen sulfide continues high in spite of a currently depressed market condition. One of the principal variables in sulfur recovery unit design is the method of reheating the feed gas to a reactor. The reheat gas method usually has the lowest investment and operating cost. The inline burner method usually results in a slightly higher conversion to sulfur and the exchanger method in a further improvement in conversion. Other important variables in sulfur plant design include plant size, feed gas composition, number of reactors, final condenser effluent temperature, and the method of disposing of the effluent gas from the final condenser. The general effects of these variables as illustrated by specific plant designs are discussed.

19542 APTIC NO. 37991

Popp, Wolfgang, Kurt Gebhard, and Hermann Schenck

DESIGN AND WORKS PRACTICE AS WELL AS CONSTRUCTION AND PRODUCTION COSTS OF TANDEM STEEL PLANTS. *(Aufbau und Arbeitsweise sowie Bau- und Verarbeitungskosten von Tandemofenstahlwerken). Text in German. Stahl Eisen (Deusseldorf), 92(2):49-57, Jan. 1972. 14 refs.*

For cleaning the waste gas from tandem furnaces, wet mechanical collectors are used. They are insensitive to the fluctuations of the carbon monoxide concentration of the waste gases. Blower and dust collection system must be designed large enough. Their dimensions determine the maximum oxygen supply and thus the production capacity. The drawing on of cold air at a reduction of gas development must be avoided. The venturi and radial flow scrubbers must be adjustable in order to maintain a constant scrubbing effect and pressure loss. Costs are cited. Metallurgical results of refining low-phosphorous and high phosphorus open-hearth steel plants are discussed.

19543 APTIC NO. 38566

Potts, John M.

USE OF POTASSIUM POLYPHOSPHATE IN SO2 RECOVERY FROM STACK GASES. *(Tennessee Valley Authority) U. S. Pat. 3,630,672. 11p., Dec. 28, 1971. 6 refs. (Appl. March 14, 1969, 12 claims).*

A process for sulfur dioxide recovery from power plant stack gases is presented. Prior recovery processes have included sodium or potassium solutions, in addition to the use of ammonia as a scrubbing agent, followed by regeneration of the scrubber effluent to give a rich stream of SO2 suitable for conversion to elemental sulfur or SO2. The extremely close temperature controls which must be maintained throughout these processes, however, and the financial deteriment inherent in the formation of potassium sulfate as part of the process were problems not solved by the prior techniques. The present recovery process consists of scrubbing the gas with a potassium polyphosphate solution to form a slurry of crystallized potassium pyrosulfite. The potassium pyrosulfite is regenerated for further pickup of SO2 by heating the slurry directly, separating the potassium pyrosulfite and treating it in a reflux stripper, heating the potassium pyrosulfite in solid form, or heating the solid potassium pyrosulfite to drive off one-third of the SO2 and reducing the remaining two-thirds to form hydrogen sulfide which is reacted with the SO2 to form elemental sulfur. (Author abstract modified)

19544 APTIC NO. 38421

Pring, Robert T.

BAG-TYPE CLOTH DUST AND FUME COLLECTORS. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 280 - 288. 7 refs. (May 3-5, Louis C. McCabe, ed.)*

Cloth filtration, including cloth tubes and cloth screens, have wide industrial application in removing dusts and fumes from gases, particularly where high cleaning efficiencies and nominal power consumption are required. Particles from 0.01 micron to coarse screen sizes can be successfully filtered at efficiencies above 99%, depending on particle characteristics and proper selection of filter material and filter cleaning methods. An important advantage in cloth filtration is that collection efficiency is reasonably constant under variable operating conditions once a suitable filtration bed has been established. Theoretical aspects of filter resistance are considered as well as bag cleaning methods and the properties and applications of filter fabrics. Two recent synthetic fabrics have extended the uses of cloth filtration: a cotton/asbestos combination, and Orlon.

19545 APTIC NO. 38080

Puetz, Manfred

AIR POLLUTION DURING CASTING BY THE CRONONG PROCESS. *(Luftverunreinigungen bei der Form- und Kernherstellung nach dem Croning-Verfahren). Text in German. Luftverunreinigung, 1969:15-17, Oct. 1969. 3 refs.*

A control method adapted to the removal of pollutants from the gas streams emitted during the manufacture of molds and cores from a material consisting of silver sand in a synthetic resin with 95-96% quartz, 3-4% phenol resin, 0.4% hexamethylenetetramine, and 0.2% calcium stearate at elevated temperatures is examined. Gases emitted during the process include ammonia, phenol, methane, carbon monoxide, carbon dioxide, and hydrogen cyanide. The control process consists of burning in the presence of a catalyst or water washing with water containing solubilizing materials, e.g., alkalies or acids.

19546 APTIC NO. 37929

Rafanelli, Renzo

APPARATUS FOR THE PURIFICATION OF WASTE GASES. *(Assignee not given.) U. S. Pat. 3,631,334. 3p., Oct. 19, 1971. 10 refs. (Appl April 9, 1969, 2 claims).*

A device is described which causes the condensation of the water vapor in internal combustion engine exhaust gases by cooling the gases. Water vapor gives the exhaust gases a high lifting power which promotes their diffusion and hence their fall-out. The water is condensed on the walls of heat exchangers by continuous changes in the direction of motion of the exhaust gases. The gases are then passed to a filter where the condensed water and impurities are separated from the purified product which can now be discharged into the atmosphere. The condensed water and impurities are stored in a vessel which is periodically emptied. (Author abstract modified)

19547 APTIC NO. 38123

Reid, Laurance S.

MIST ELIMINATOR. *(Assignee not given.) U. S. Pat. 3,616,623. 3p., Nov. 2, 1971. 6 refs. (Appl. Jan. 19, 1970, 1 claim).*

An improved mist eliminator is described for removing an entrained liquid mist from a liquid particle containing carrier gas. The apparatus is of the type which includes a pressure shell having a gas inlet and a gas outlet. It includes a plurality of generally parallel vanes defining flow paths for the gas, and baffles of permeable porous or fibrous material cover the surfaces of the vanes along the paths. The previous vane type of device had large gas capacity, but its ability to remove finely divided mists was confined to about 20 micron; the fibrous pad device had the ability to remove aerosols as small as 4 micron or larger but relatively small capacity so that large pad areas were required. (Author abstract modified)

19548 APTIC NO. 38681

Reinauer, Thomas V.

VERTICALLY SECTIONED DUST COLLECTOR. *(Slick Industrial Co., Summit, N. J.) U. S. Pat. 3,630,005. 9p., Dec. 28, 1971. 14 refs. (Appl. March 18, 1968, 17 claims).*

Increasing concern with air pollution and the pressure of continually rising costs have created a demand for dust collection apparatus of increased capacity and with a capability of handling gaseous carriers of elevated temperatures. The art has generally turned to vertically oriented units of increased height, but such vertical extension presents problems of increasing magnitude. These include an increase in filter bag diameter, an increased reliance upon spreader rings or other expedients to prevent bag collapse during cleaning, and complications of the cleaning mechanisms. Apparatus for separating particulate matter from gaseous carriers is described which is formed of a plurality of discrete filter chambers disposed in a vertical and superimposed relation. The filter chambers are interconnected by a vertically oriented conduit member that is constituted at least in part by a permeable filter medium that forms a portion of the walls which define each chamber. This device includes means for the cleaning of vertically disposed filter media by preferentially subjecting the lower portion of the media to an effectively greater quantity of cleaning. (Author abstract modified)

19549 APTIC NO. 38323

Reissner, Richard

DESULFURIZING COMBUSTION GASES. *(Verfahren Entschwefelung von Vebrennungsgasen). Text in German. (Steirische Magnesit-Industrie A. G., Vienna (Austria) W. Ger. Pat. Appl. 2,000,059. 14p., Jan. 2, 1970. 12 refs. (2 claims).*

Sulfur compounds (hydrogen sulfide, sulfur dioxide, mercaptans, carbonyl sulfide, and carbon disulfide) can be separated from exhaust air and combustion or production gases by treating the sulfur-containing gases with a washing fluid containing organic compounds such as sodium N,N-bis(2-hydroxyethyl)glycinate, diethylenetriaminepentaacetic acid, or (Beta-hydroxyethylimino)diacetic acid in a washer with metals that form complexes with the organic washing liquid. The concentration of the organic compounds is 0.01-50 wt%. The gas is retained in the purifier for 0.5-30 sec. Sewer gas with 300 ppm H2S was led over iron turnings at 30 deg and atmospheric pressure in countercurrent flow to a 1% aqueous solution of the sodium salt of diethylenetriaminopentaacetic acid with a flux of 1200 cu m/hr. The gas issuing from the purifier was free of H2S.

19550 APTIC NO. 37946

Reiter, A.

POLLUTION RESEARCH TRENDS IN THE OIL INDUSTRY. *(Gli orientamenti dell industria petrolifera per le ricerche nel settore dell inquinamento). Text in Italian. Riv. Combust. (Milan), 25(12):562-567, Dec. 1971.*

Pollutants resulting from the processing of crude oil and especially from the use of its products are sulfur oxides, hydrocarbons, and products of incomplete combustion, nitrogen oxides, and small amounts of solids in powder form. Today all refinery processes are so perfected that they emit a minimum of pollutants; even catalytic cracking plants do not emit catalyst dust as they used to as a result of the installation of cyclones. The excess of gases not used internally by the refinery is burned completely by the torch flames. Proper maintenance of all equipment reduces pollution practically to zero. Sulfur compounds in the course of distillation are distributed among various fractions and roughly 20% pass into light and medium fractions and 80% into heavy residues. Only the light and medium fractions can be easily desulfurized, heavy residues poison catalysts by their asphalt and metal content. Currently research is working on the vacuum desulfurization of gas oil, on desulfurization of gas oil by coking, on the desulfurization of the atmospheric residue, and on the vacuum desulfurization of asphalt-free residues. These processes, while operative on a limited scale, are not yet economically advantageous. The products of these processes have a low sulfur content from 0.3 to 1% and are used as fuel oils. Where fuel oils are used industrially, such as in power plants, flue gas purification is necessary. Dry processes generally are more advantageous than wet ones (no cooling of gases required, better separation) and include the alkalized alumina process which yields sulfur, catalytic oxidation, the Reinluft process, the Kiyoura process, and combustion engineering using dolomite. Other processes under development are the Peter Spence, The Penelec, the Wickert and the Babcock and Wilcox. Research is being conducted in the field of dispersion of atmospheric pollutants and complicated mathematical models are being constructed which take into account all factors affecting dispersion, in the field of reducing pollutants emitted by internal combustion engines by engine modification and by afterburners.

19551 APTIC NO. 38126

Revell, Alan E. and Wilson A. Welch

FILTER CELL SEALING AND RETAINING ARRANGEMENT. *(American Air Filter Co., Inc., Louisville, Ky.) U. S. Pat. 3,630,008. 4p., Dec. 28, 1971. 11 refs. (Appl. Oct. 23, 1969, 2 claims).*

In the prior art, a number of filter cell sealing and retaining arrangements are known in which a filter cell is firmly held in sealed relation to its support frame structure. These past arrangements have included complex screw mechanisms, compressible springs, and cam and wedge devices -- all of which have included several parts and have been complex to manufacture and assemble. A sealing and retaining arrangement of a flow-through filter cell housing is described which includes a retaining bar mounted on the housing which slides in both a longitudinal and lateral direction. The filter cell housing has a longitudinally, track mounted, slidable, hollow, peripheral seal formed from several sections, at least one of which is compressible and oversize in length to bear firmly against the other. (Author abstract modified)

19552 APTIC NO. 38386

Richter, U., U. Schulz, and Quang Nguyenngoc

TECHNOLOGICAL EFFECTS OF ELECTRIC SEPARATORS ON THE SEPARATION OF TIN OXIDE. *(Ueber technologische Einfluesse auf die Abscheidung von Zinnoxid mit Elektroabscheidern). Text in German. Luft Kaeltetech., 3(6):304-307, Dec. 1970. 5 refs.*

Reduction smelting of tin ore concentrates and the thermal processing of ores of low tin content produce considerable amounts of tin oxide in the form of fly ash in gases emitted by the smelters. Since tin oxide is the desired end product, its recovery by electrostatic precipitation is of primary importance. Laboratory experiments designed to determine the effect of temperature (within a range of from 100 to 350 C) and of the dew point (within a range of 30 to 70 C) on the efficiency of an electric separator are described and evaluated. The dust particles are about 1 micron in size and contain about 55% tin and about 6.5% zinc and lead. The experiments disclosed that a rise in temperature from 100 to 350 C reduced considerably the maximal operating voltage and the maximal specific current consumption. The highest separation is consequently achieved at low temperatures because at these temperatures current consumption is at its maximum. At constant current consumption a higher dew point results in more efficient separation over the entire temperature range. The temperature range between 100 and 150 C was optimal but in practice separation usually takes place at between 200 and 250 C. To achieve maximal separation within this range, the moisture content must correspond to a dew point of around 50 C.

19553 APTIC NO. 38247

Ritzmann, H.

THE EFFECT OF DUST CYCLES ON THE HEAT CONSUMPTION OF ROTARY KILN PLANTS WITH RAW MEAL PREHEATERS. *(Der Einfluss von Staubkreislaeufen auf den Waermeverbrauch von Drehofenanlagen mit Rohmehlvorwaermer). Text in German. Zement-Kalk-Gips (Wiesbaden), 60(12):576-580, 1971. 3 refs.*

With the aid of a computer program and on the basis of dust measurements made in small-scale tests and in actual industrial installations, the relation between different values of dust precipitation efficiency in the preheater system and the fuel consumption of the rotary kiln plant as a whole was calculated. A decrease in the efficiency of the two bottom cyclone stages from 90-60% increase the fuel demand of the plant by about 34 kcal/kg clinker. If the efficiency of only the bottom stage is reduced from 90-60%, the increase in heat consumption is 13 kcal/kg of clinker. This increase is less if the precipitation stage whose efficiency is reduced is closer to the inlet of the preheater.

19554 APTIC NO. 37938

Rixmann, W.

THE DEVELOPMENT OF THE TWO-DISK-NSU-WANKEL ENGINE IN THE MODEL RO 80. *(Zur Entwicklung des Zweischeiben-NSU-Wankelmotors im RO 80). Text in German. Automobiltech. Z. (Stuttgart), 73(12):476-478, Dec. 1971. 3 refs.*

The hydrocarbon emission by the RO 80-NSU-Wankel engine is twice as large as that of the conventional piston engine. Through the higher exhaust gas temperature (100 to 150 C above that of conventional engines), thermal afterburning can be easily and efficiently carried out. The hydrocarbons can be eliminated almost entirely. The carbon monoxide emission depends only on the fuel/air ratio. Afterburning also reduces the CO drastically. The nitrogen oxides concentration in the exhaust gas of the RO-80 engine is far below that of the conventional engine to begin with. It is only 30% of that of the conventional engine. Thus the engine meets the legal requirements set in the U. S. Moreover, the engine can be driven with normal gasoline. It still functions properly at an octane number of 90. The reduction of the lead content in the fuel will pose no problems for this engine.

19555 APTIC NO. 38068

Roberts, Melvin L., Carl E. Johnson, and Richard C. Miller

METHOD FOR THE REMOVAL OF HYDROGEN SULFIDE FROM GASEOUS STREAMS. *(Nalco Chemical Co., Chicago, Ill.) U. S. Pat. 3,622,273. 5p., Nov. 23, 1971. 6 refs. (Appl. Feb. 6, 1970, 13 claims).*

A method is provided for removing hydrogen sulfide from gas streams by using an absorbing solution that is buffered to a preferred pH range. The gas stream is contacted with an absorbing solution of from 0.005 to 20% of a ferric ion complex, from 25.0 to 99.945% water, from 0.05 to 10.0% of a buffering agent, and from 0 to 74.945% of a water soluble, organic solvent selected from the group consisting of dimethyl formamide and dimethyl sulfoxide. In a previous method which used iron or certain other polyvalent metals with a chelating agent, if the fluid stream had a very low pH, the performance of the complex dropped off considerably. (Author abstract modified)

19556 APTIC NO. 37808

Robinson, Myron

A NOTE ON THE SIGNIFICANCE OF PARTICLE CHARGING TIME IN ELECTROSTATIC PRECIPITATION. *Atmos. Environ., 6(1):61-63, Jan. 1972. 6 refs.*

A question is raised regarding the validity of the recent claim that particle charging time due to ion bombardment in electrostatic precipitators is greater than generally supposed. Associated with the effective migration velocity of a real precipitator, an effective charging time can be postulated. It is suggested that this effective value may be significantly less than its theoretical counterpart. (Author abstract)

19557 APTIC NO. 37790

Rohacz, Ivan and Rene Keller

AFTERBURNER FOR THE EXHAUST GASES OF INTERNAL COMBUSTION ENGINES. *(Nachverbrennungseinrichtung fuer die Auspuffgase von Brennkraftmaschinen). Text in German. (Ustav Pro Vyzkum Motorovych Vozidel, Prague (Czechoslovakia)) W. Ger. Pat. 1,576,790. 6p., Oct. 21, 1971. 6 refs. (Appl. Nov. 28, 1967, 5 claims).*

The afterburner inserted between the engine block and exhaust channel has an air feeding channel approximately perpendicular to the exhaust channel. The plate-shaped afterburner extends over several exhaust openings, each with an air feeding channel, and contains an air distributor channel. The afterburner is fitted in a radial groove of the inlet flange of the exhaust manifold. The air feeding channels protrude into the exhaust channel, and may be placed close to the exhaust values. The afterburner can also be inserted in engines now available or engines of small stroke volume without alterations on the cylinder head or the exhaust manifold, and without disturbing the flowdynamic conditions. The air feeding channels can be designed in the form of air pipes. The air pipes both preheat the additional air, and increase the efficiency of the combustion. The additional air can be used to cool the cylinder head or the valve piston, which results in longer life.

19558 APTIC NO. 37877

Rohr, Fred W.

METHOD FOR TREATING HEATED GASES TO SUPPRESS STEAM PLUME FORMATION. *(P and W Engineers, Inc., Chicago, Ill.) U. S. Pat. 3,619,985. 5p., Nov. 16, 1971. 3 refs. (Appl. Nov. 26, 1968, 2 claims).*

In conventional water scrubbing systems, a large quantity of moisture in the form of water vapor is introduced into the gases and condensation of the water vapor upon contact of the combustion gases with the relatively cool ambient air often results in a visible steam plume emission. A method and system are presented for removing particulate matter from combustion gases and for concomitantly suppressing steam plume formation. A scrubber passes a fluid through the combustion gases to remove the particulate matter and, preferably, introduces the fluid under conditions such that the temperature of the combustion gases are reduced substantially below their dew point. This latter action dehydrates the gases by condensation of their water vapor. The relatively hot and contaminant bearing fluid discharged from the scrubber is circulated through a heat exchanger wherein it is utilized to preheat ambient air which is then intermixed with the dehydrated combustion gases. The intermixed air and combustion gases are discharged to the atmosphere through a conventional stack. The relatively hot scrubber fluid, cooled by its passage through the heat exchanger, is recirculated to the scrubber for repeated use, preferably after the fluid has been suitably clarified. (Author abstract modified)

19559 APTIC NO. 37878

Rohr, Fred W.

SUPPRESSION OF THE STEAM PLUME FROM INCINERATOR STACKS. *(P and W Engineers, Inc., Chicago, Ill.) U. S. Pat. 3,619,983. 4p., Nov. 16, 1971. 3 refs. (Appl. Nov. 26, 1968, 3 claims).*

In conventional water scrubbing systems, a large quantity of moisture in the form of water vapor is introduced into the gases, and condensation of the water vapor upon contact of the combustion gases with the relatively cool ambient air often results in a visible steam plume. Methods and apparatus are presented for treating the heated gases to remove particulate matter and to suppress steam plume formation upon discharge of the gases to the atmosphere. The gases are directed through a first heat exchanger passageway to a conventional scrubber where substantially all of the particulate matter is removed. The scrubber also functions to reduce the temperature of the gases below their dew point for effectively dehydrating the gases by condensation of their water vapor. The dehydrated, scrubbed, and cooled gases are passed through a second passageway of the heat exchanger and are reheated by intimate thermal contact with the gases passing through the first passageway. (Author abstract modified)

19560 APTIC NO. 38046

Roman, Vernon A.

GAS WASHER. *(Assignee not given.) U. S. Pat. 3,620,509. 8p., Nov. 16, 1971. 15 refs. (Appl. Jan. 24, 1969, 1 claim).*

While previous devices wash a gas reasonably well, certain problems do exist: because of the individual jets in a spray or a shower, there are open paths in the shower through which gas particles can pass without the liquid acting on them. A gas washer is described which maximizes washing efficiency by having the gas pass through a series of separate, continuous sheets of liquid.

19561 APTIC NO. 38120

Roth, James Frank and Alexander Wolberg

PROCESS AND CATALYSTS FOR THE TREATMENT OF FLUE GASES FROM HYDROCARBON COMBUSTION. *(Verfahren und Katalysatoren zur Behandlung von Abgasen der Kohlenwasserstoffverbrennung). Text in German. (Monsanto Co., St. Louis, Mo.) W. Ger. Pat. 2,048,866. 25p., April 15, 1971. (Appl. Oct. 5, 1970, 6 claims).*

A procedure for the catalytic treatment of flue gases from hydrocarbon combustion is presented. A minimum 50% by weight of the active metal components in the total amount of the mixture are present in the form of metal aluminate when determined by X-ray-K-absorption spectroscopy. Aluminum oxide is used as catalyst carrier and copper aluminate is the metal aluminate. The copper aluminate component has a crystalline fraction of less than 4.0%, related to the weight of the catalyst. The metal component of the catalysts may also consist of nickel aluminate and/or cobalt aluminate, and/or iron aluminate, and/or chromium aluminate, and/or manganese aluminate, and cannot be determined by the X-ray diffraction methods. The process can be used to oxidize and reduce gas components from hydrocarbon combustion processes in the absence, and then in the presence of added air. The oxidizable gas components are carbon monoxide and hydrocarbons, and reducible components are nitrogen oxides. The catalyst is resistant to high temperature decomposition.

19562 APTIC NO. 38370

Rueb, Friedmund

DUST COLLECTION AND PRODUCT RECOVERY IN THE FOOD INDUSTRY. *(Entstaubung und Produkt-Rueckgewinnung in der Nahrungsmittelindustrie). Text in German. Wasser Luft Betrieb, 16(2):53-57, Feb. 1972.*

At almost all processes in the food industry dust develops which is mostly of organic origin. Apart from harmful properties, these dusts are valuable products whose most thorough recovery is very important. High-quality steel must be used for the dust collection equipment in order to avoid any contamination of the recovered dust. Centrifugal separators alone or in combination with cloth filters are used for the recovery of fine dusts. Rotary flow dust extractors are used in the food industry behind spray driers for dry product recovery, e.g., at the production of pulverized coffee and skimmed milk products. Two such extractors with an air throughput of 17,000/cu m/hr are shown in an illustration. A collection efficiency of 99% was achieved at a dust load in the uncleaned gas of 15 g/cu m. The use of cloth filters and bag filters has a tradition in the food industry which dates back to the past century. The filter bags can be arranged in a round or rectangular pattern. Heat resistant cotton is mostly used as a material. The envelope-type of cloth filter has come increasingly into use in the food industry. This is due to the fact that a large filter area can be accommodated on relatively small space. They can be easily set-up at the points of dust development.

19563 APTIC NO. 37970

Ruuskanen, Torsti, Kirsti Kannisto, and Toivo Korosuo

THE AEROSOL RETENTION CAPACITY OF FIBER FILTERS AS AFFECTED BY THE AEROSOL PARTICLE SIZE AND LINEAR FLOW RATES. *(Das Aerosolretentionsvermoegen von Faserfiltern als Funktion der Teilchengroesse des Aerosols bei verschiedenen linearen Stroemungsgeschwindigkeiten). Text in German. Ann. Acad. Sci. Fenn., Ser. A2, no. 159, 3-15, 1970. 16 refs.*

Theoretic and experimental investigations of the retention capacities of different fiber filters are reported. As the filters investigated were intended for use in gas masks, flow rates normally encountered in breathing only were considered. The mixed-fiber filters studied consisted of cellulose fibers of 20-50 micron diameter and asbestos or glass fibers with 1 micron diameter. Velocity fields were investigated for isolated fibers in different filtration mechanisms, and the interference due to nearby fibers were considered in correction equations. The performance of the isolated fiber was calculated from Friedlander's equation, as a function of the particle size with given flow speed. The empirical equations by Chen and Davies were applied to determine the interference due to nearby fibers. Finally, the performance of the complete filter was calculated from the equations by Lanmuir, Davies, and Fuchs. The location of the minimum filter performance was dependent on both particle size and fiber diameter. Increasing diameters caused the minimum to shift towards greater particle sizes, and increasing linear flow speeds towards smaller particle sizes. The retention capacities as a function of particle size were studied with monodisperse dioctylphthalate mist of 0.1-0.6 micron at flow rates of 30, 45, 65 and 85 l/min. A retention capacity minimum was found for all filters in a range of 0.1-0.5 micron. Also a maximum was obtained for certain filter types at specific flow speeds with smaller particles. Decreasing distance between maximum and minimum was found with increasing flow rates, and both maximum and minimum were eliminated at a definite high flow speed. From that point the filters showed persistently decreasing performances with decreasing particle size.

19564 APTIC NO. 38565

Saito, Hirotaro and Shigeo Kamio

SODA RECOVERY BOILER EXHAUST GAS PURIFICATION METHOD. *(Soda kaishuyo boira no hai-gasu jokaho). Text in Japanese. (Honshu Paper Mfg. Co., Ltd., Tokyo (Japan)) Japan. Pat. Sho 46-40482. 3p., Nov. 30, 1971. 1 ref. (Appl. April 28, 1967, 1 claim).*

This is a method of eliminating the remaining mirabilite dust and sulfur oxides from the exhaust gas of a Kraft Pulp mill soda recovery boiler, which has already been treated by an electrostatic precipitator. Even with the high rate of collection of 93 to 95% by an electrostatic precipitator, close to 750 tons of mirabilite dust and toxic gas are emitted daily from every pulp mill of 430 ton/day capacity. By this method, the exhaust gas from the recovery boiler is led to an electrostatic precipitator and 93% to 95% of dust is eliminated. The treated gas is then led to the invented apparatus. This is a large, cylindrical atomizer, in which the black liquor from a tank is jet sprayed from the top through a rotation disk and a ring shower. At the bottom of the chamber lies a funnel shaped receptacle with a number of slits with baffle boards. The remaining dust and sulfur oxides in the exhaust gas are completely absorbed by atomized black liquor and go out through the slits. The sulfur dioxide absorbed in the black liquor can be recovered as sodium sulfite.

19565 APTIC NO. 38001

Saleem, A.

FLUE-GAS SCRUBBING WITH LIMESTONE SLURRY. *Ont. Hydro Res. Quart., 23(2):35-47, 1971. 3 refs.*

A scrubbing process for flue gas desulfurization, based on naturally occurring carbonate rocks, was developed from laboratory to pilot plant scale. Simulated flue gas scrubbing with an aqueous slurry of 3% limestone showed that sulfur dioxide removal efficiency in excess of 90% could be achieved at an apparent gas-liquid contact time of 0.3 sec or more. Calcitic limestones are better sulfur dioxide absorbents than dolomitic stones when used in slurry form. Tests with a 200 cfm pilot plant indicated that more than 70% SO2 removal is achieved by flue gas scrubbing with limestone slurry over a flooded marble-bed scrubber. The efficiency of limestone utilization was between 70-80%. A continuous run of more than 200 hr indicated that the system would operate free from plugging and scaling. (Author abstract)

19566 APTIC NO. 38224

Sarto, Jorma O.

EXHAUST VELOCITY CONTROL OF EXHAUST RECYCLING. *(Chrysler Corp., Highland Park, Mich.) U. S. Pat. 3,626,913. 5p., Dec. 14, 1971. 6 refs. (Appl. April 13, 1970, 5 claims).*

Previous exhaust recycling systems designed to reduce nitrogen oxide in engine exhausts have not been commercially acceptable from the standpoint of cost or operating efficiency, and have not provided for a progressive increase in recycling with engine load or for reduced recycling at decreased loads. These disadvantages are overcome by means of a bypass conduit through which exhaust gases are recirculated to the inlet system as a function of load. The upstream end of the bypass duct comprises a pitot-type opening exposed to the velocity flow of the exhaust gases within the exhaust system. The downstream end of the bypass duct also comprises a pitot-type opening exposed to the velocity pressure of the inlet flow at wide-open throttle and increasingly shielded by the customary throttle valve as the latter closes from the wide-open position. During engine idling, when the pressure differential between opposite ends of the bypass duct is nominal and when nitrogen oxide emission is a minor problem, the bypass flow of exhaust gases will be nominal. The flow may again be nominal at wide-open throttle when maximum power is required.

19567 APTIC NO. 38285

Schinzel, Walter

PRODUCTION OF SMOKELESS FUEL BY BRIQUETTING COAL USING SULPHITE LIQUOR AS A BINDER. *(Raucharme Briketts aus mit Sulfitablauge gebundenen Steinkohlen). Text in German. Erodel Kohle (Hamburg), 25(2):65-69, Feb. 1972. 6 refs.*

The characteristics and properties of sulfite liquors are surveyed, and a new method for producing smokeless fuel is described using sulfite liquor as a binder in the briquetting of hard coal. The sulfite lyes are waste products from paper mills. In the Federal Republic of Germany mainly calcium bisulfite lyes are available; sodium (Na), magnesium (Mg), and ammonium (NH4) sulfite waste lyes are available to a lesser extent. Sulfite lyes usually have a water content of 40 to 50% and solids content of 50 to 60%. Sulfite waste lyes are smokeless upon burning and available in large quantities at low price. In a new hard coal briquetting process, the sulfite waste lye with a temperature of 30 to 50 C is added to the coal with a temperature of 100 C in a continuously operating mixer. In the mixing process, the binder is thickened only by the heat from the coal. Through drawing off measured amounts of developing fumes, the thickening process of the sulfite waste lye in the briquetting material can be controlled. By this method, a briquetting material is obtained with a water content of 2 to 5% which can be easily pressed into shape. The reliability and efficiency of this method was confirmed by practical experience. The soot and tar number measured in the combustion of low-volatile coal treated with ammonium sulfite liquor (26) and that also (26) measured in the combustion of caking coal treated with calcium sulfite liquor was far below the limit values (200) in existence in North Rhine Westphalia since November 1969.

19568 APTIC NO. 38365

Schoell, G.

LARGE HEAT STORERS. A CONTRIBUTION TO POWER GENERATION AND ENVIRONMENTAL PROTECTION. *(Grosswaermespreicher. Beitrag zu Energiewirtschaft und Umweltschutz). Text in German. VDI (Ver. Deut. Ingr.) Nachr. (Berlin), 25(48):1-2, Dec. 1971.*

The water content of an artificial or natural sweet or salt water lake can be heated to a temperature close to the boiling point (for instance to 97 C) provided the water level is protected against evaporation and heat losses. A lake filled with warm water is the most inexpensive heat and power supplier. Large heat suppliers of this type can contribute enormously to the protection of the environment because there is no emission of waste heat into the atmosphere, and if used for the supply of remote heat, individual domestic heaters which are heavy air polluters become superfluous. Protection against evaporation and heat loss can nowadays be realized by simple means. Plastic foils made of polypropylene with a specific weight of 0.91 g/cu cm, which are vapor tight and can resist temperatures to 100 C, can be used as protection against evaporation loss. Polyurethane plates can be used to prevent heat loss. With a polyurethane layer of 25 cm thickness, the average heat loss per year is 8 kcal/sq m hour. The bearing strength is 200 kg force/sq m so that a thin layer of soil can be spread out on top of it and landscaped. The water could be heated by waste heat. A large heat supply lake with a heat capacity of 15 million Gcal would use 15 million Gcal waste heat, which otherwise would go into the atmosphere.

19569 APTIC NO. 38082

Schwegmann, J. C. and L. Leder

PURIFICATION OF ELECTROLYSIS-FURNACE FLUE GAS FROM ALUMINUM FOUNDRIES. *(Abgasreinigung der Elektrolyseofen-Abgase von Aluminum-Huetten). Text in German. Luftverunreinigung, 1969:17-20, Oct. 1969.*

A technique for the purification of waste gases emitted from the electrolytic cells of aluminum manufacturing plants is presented. The problems of withdrawing the gases from each cell individually or from the building housing the cells are reviewed. The best method of removing the gases from each cell is individual encapsulation. The exhauster must be designed to leave sufficient access to the cells but simultaneously prevent any emission of the waste gases into the work shop. A negative pressure must be maintained in the exhauster spanning the surface of the cell; removable sheet steel plates are installed on the sides. In cases where individual withdrawal is not feasible, centralized cleaning, using ventilators and scrubbers, is possible. Due to the great volumes of air to be drawn off in centralized cleaning, the cleaning efficiency of the diluted gases withdrawn centrally is much lower than that of the concentrated gases withdrawn individually. The process for individual withdrawal is reviewed. The control equipment consists of an exhaust system for waste gas drawing, cyclones for dust removal, scrubbers for removal of gaseous fluorine, and high stack discharge.

19570 APTIC NO. 37871

Severn, Alpha

ANTISMOG CARBURETOR. *(Assignee not given.) U. S. Pat. 3,618,907. 4p., Nov. 9, 1971. 12 refs. (Appl. Jan. 28, 1969, 1 claim).*

Carbon monoxide and other noxious gases are discharged from a motor vehicle at a relatively high rate when the foot is removed from the accelerator and the vehicle is decelerated. This is due to the relatively high degree of vacuum in the intake manifold which causes excessive flow of fuel to the vehicle through the idling nozzle of the carburetor, it being impossible for complete combustion to take place in the absence of sufficient air. A vacuum-controlled valve was adapted to cut off the admission of fuel to a carburetor idling jet when the motor vehicle is decelerated and vacuum in the intake manifold is high. The engine thus acts as a brake and, when deceleration takes place to a predetermined extent, the drop in vacuum or increase in pressure in the intake manifold opens the valve to admit fuel to the carburetor to prevent the motor from stalling. (Author abstract modified)

19571 APTIC NO. 37880

Shah, Indravadan S.

RECOVERY OF SULFUR DIOXIDE FROM WASTE GAS STREAMS. *(Chemical Construction Corp., New York) U. S. Pat. 3,607,033. 5p., Sept. 21, 1971. 8 refs. (Appl. Jan. 27, 1969, 11 claims).*

Sulfur dioxide can be scrubbed from a waste gas stream using an aqueous sodium sulfite solution. The resulting solution containing sodium bisulfite and residual sodium sulfite is divided into two portions. Sodium carbonate is added to the first portion to convert sodium bisulfite to sodium sulfite, and the resulting solution is recycled for further gas scrubbing. The second portion is reacted with a solid carbonate reactant such as dolomite, magnesite, or limestone, to form sodium carbonate in solution and precipitate solid crystals containing magnesium sulfite and/or calcium sulfite. The sodium carbonate is added to the first portion for the conversion of bisulfite to sulfite. The solid crystals are processed at an elevated temperature to produce a sulfur-containing product and a mixture of solid magnesium oxide and calcium oxide, either pure magnesium oxide or calcium oxide, depending on the solid reactant selected in the prior processing. (Author abstract modified)

19572 APTIC NO. 38049

Shah, Indravadan S.

REMOVAL OF SULFUR DIOXIDE FROM GAS STREAMS. *(Chemical Construction Corp., New York) U. S. Pat. 3,622,270. 5p., Nov. 23, 1971. 7 refs. (Appl. Feb. 27, 1970, 5 claims).*

Sulfur dioxide can be scrubbed from a gas stream using an aqueous solution containing dissolved magnesium sulfite and magnesium bisulfite, which is divided into two portions. A first portion is sprayed centrally downward into a vertical oriented venturi passage through which the gas stream is passed in a downward direction. The second portion of the scrubbing solution flows downward in the inner surface of the converging section of the venturi. Improved scrubbing efficiency is attained with low liquid to gas flow ratios. (Author abstract modified)

19573 APTIC NO. 38268

Shah, Indravadan S.

RECOVERY OF SULFUR DIOXIDE FROM WASTE GASES. *(Chemical Construction Corp., New York) U. S. Pat. 3,617,212. 6p., Nov. 2, 1971. 8 refs. (Appl. June 14, 1968, 6 claims).*

A process is provided to efficiently and econonomically absorb and recover sulfur dioxide by scrubbing the waste gas stream with an aqueous solution of magnesium sulfite to form magnesium bisulfite in solution. The resulting solution is divided into two portions. Magnesium hydroxide is added to the first portion at a controlled rate to convert magnesium bisulfite to magnesium sulfite, which is then recycled for further waste gas scrubbing. The magnesium sulfite and magnesium bisulfite content of the second solution portion are processed at an elevated temperature to produce magnesium oxide and a gas stream of high sulfur dioxide content, usually about 10% by volume. The magnesium oxide is slaked with water to form magnesium hydroxide which is added to the first solution portion, and the gas stream of high sulfur dioxide content is utilized to produce a sulfur-containing product. (Author abstract modified)

19574 APTIC NO. 38635

Shah, Y. T. and C. N. Kenney

APPLICATIONS OF PENETRATION AND FILM THEORIES TO THE CATALYSIS OF GAS REACTIONS BY LIQUID CATALYSTS: THE OXIDATION OF SULPHUR DIOXIDE. *Chem. Eng. Sci., 27(1):1-10, Jan. 1972. 12 refs.*

A general analysis is given, using film and penetration theories, of the reaction of sulfur dioxide and molecular oxygen to give the gaseous product sulfur trioxide. The reaction is assumed to take place in solution and is catalyzed by an involatile solute which can exist in oxidized and reduced forms. The implications for the industrial SO2 oxidation process in which the catalyst is an ionic melt of vanadium pentoxide in potassium pyrosulfate are considered. (Author abstract modified)

19575 APTIC NO. 37772

Shale, C. C., D. G. Simpson, and P. S. Lewis

REMOVAL OF SULFUR AND NITROGEN OXIDES FROM STACK GASES BY AMMONIA. *Chem. Eng. Progr. Symp. Ser., 67(115):52-58, 1971. 16 refs.*

Complete removal of sulfur dioxide and partial removal of nitrogen dioxide impurities from a simulated stack gas mixture were effected in laboratory experiments by vapor-phase reaction with ammonia. A cyclic process utilizing ammonia involves recovery of the feeds by thermal decomposition and reaction of acidic constituents with zinc oxide. Ammonia is separated for recycle, and essentially pure sulfur dioxide is recovered as a by-product. Ash particles not removed by mechanical separation are trapped in the condensate. A flow diagram for commercial application of this conceptual process is discussed. The vapor-phase process requires minimal water additions through utilization of a recycle system. Existing markets are available for all products of the process. Stack height requirements are minimized, regenerating temperatures of various salts are very low, and the process will work on high sulfur coal to allow savings on fuel costs and a higher return on by-product sulfur dioxide. (Author abstract modified)

19576 APTIC NO. 38064

Shriner, Walter

AIR POLLUTION REDUCTION SYSTEM. *(Assignee not given.) U. S. Pat. 3,623,295. 3p., Nov. 30, 1971. 30 refs. (Appl. March 23, 1970, 1 claim).*

An air pollution reduction system is described which comprises an elongated dielectric means to induce electrostatic forces in the path of a polluted fluid stream for maximum precipitation of solids and their collection. The entrapment or collection zones are defined by units fabricated from high density plastic in which there is provided, in advance of the collection zones, a series of tubular passageways of considerable length. (Author abstract modified)

19577 APTIC NO. 38422

Silverman, Leslie

CHARACTERISTICS OF FILTER BEDS FOR AEROSOLS. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washongton, D. C., 1950, p. 289 - 301. 29 refs. (May 3-5, Louis C. McCabe, ed.)*

Applications of deep bed filters for removing particulate matter from air depend on a compromise between power cost and desired efficiency. Although high replacement costs for fixed types have limited their use, in some cases self-cleaning or stripping and cleaning for re-use is possible. For low dust or fume loading where efficient removal is desireable and high power costs are permissible, deep bed filters can be made which will outperform all other types. Three types of filter beds are described: static fibrous, static aggregate, and dynamic aggregate. Theoretical factors governing resistance, features influencing separation performance, and the variable gradient bed and its possibilities are discussed. Performance data are given, and applications of various filter beds and the effects of aerosol properties on performance are considered.

19578 APTIC NO. 38077

Singewald, Arno

PROCEDURE FOR ION EXCHANGER FLOTATION. *(Verfahren zur Flotation von Ionenaustauschern). Text in German. (Wintershall A. G., Celle (West Germany)) W. Ger. Pat. 1,767,360. 4p., Dec. 30, 1971. 3 refs. (Appl. Sept. 6, 1961, 3 claims).*

A technique for ion exchanger separation from aqueous suspension by flotation induced by foamed amphoteric material of opposite charge is presented. An amphoteric material is adsorbed onto the ion exchanger which is to be floated from the solvents. The adsorbate is formed in an aqueous suspension by blowing in a gas. Anion exchangers with quaternary nitrogen on a base of polystyrene, divinyl, and benzene are floated at a pH of no less than 3-4, at 5-7 with fatty acids or their esters, alkali sulfates, or sulfonates in water or in a diluted aqueous solution. Cation exchangers carrying a negative charge, e.g., with sulfur trioxide functional groups, are floated at pH 1-8 with primary or secondary amines or with quaternary ammonium compounds in water or in aqueous solutions. The flotation is used in processes where filter-damaging solids are emitted and allows the ions on the exchanger to be recovered and the ion exchanger to be regenerated.

19579 APTIC NO. 38267

Skinner, Davis A.

INTERNAL COMBUSTION ENGINE FUEL SYSTEM MINIMIZING EVAPORATIVE FUEL LOSSES. *(Union Oil Co. of California, Los Angeles) U. S. Pat. 3,617,034. 5p., Nov. 2, 1971. 8 refs. (Appl. Feb. 25, 1970, 6 claims).*

Fuel losses and accompanying air pollution are lessened by equipping an internal combustion engine with a fuel tank having a collapsible liquid fuel compartment and means for withdrawing any fuel vapors which form and combusting them in the engine. Attempts have been made to minimize the generation of gasoline vapors by insulating gasoline tanks, but these have not been particularly successful, since even at atmospheric conditions substantial amounts of vapors are produced. (Author abstract modified)

19580 APTIC NO. 38443

Skinner, Geoffrey Frederick

METHOD OF COLLECTING AND TREATING EXHAUST GASES CONTAINING CARBON MONOXIDE. *(Foster Wheeler Corp., Livingston, N. J.) U. S. Pat. 3,615,355. 4p., Oct. 26, 1971. 7 refs. (Appl. Sept. 9, 1968, 3 claims).*

The very high temperatures of the blow gases which result from contacting iron with oxygen or air in the production of steel makes their collection rather difficult because the converter apparatus in which the steel is made is usually moveable. A joint must be provided between the steel converter apparatus and the collection pipe through which the blow gases are conveyed to prevent the escape of carbon monoxide in the blow gases, since it is toxic and inflammable, and the ingress of air leads to a wastage of the CO by dilution. In the present invention, the joint is sealed by a blast of carbon dioxide which serves as a shielding gas.

19581 APTIC NO. 38031

Smetana, J.

SLAG CHAMBER WITH MOBILE DUST COLLECTOR. *(Schlackenkammern mit ausfahrbaren Staubsammlern). Text in German. Radex Rundschau (Austria), no. 4:267-271, Oct. 1970.*

The performance of Maerz-Boelens OH furnaces with and without mobile dust collectors was studied for two years in the melting shop of an iron and steel works. The mobile dust collectors increased the ingot production of the furnaces by 5.65% and decreased maintenance costs by 13.16%. Initially, the slag chambers with mobile dust collectors were installed to improve working conditions: increases in production and decreases in maintenance costs were not expected. The increased production was the result of fewer dust deposits in the checkers and thus more constant draft conditions in the furnaces and reduced wear of the slag-chamber side-walls, particularly the suspended port-ends. With the dust collectors, the fixed part of a chamber is not attacked by slag deposits and no blasts are required.

19582 APTIC NO. 38345

Smissen, Carl Ernst van der

RETENTION CAPACITY OF AEROSOL FILTERS FOR PROTECTIVE MASKS. *(Aufnahmevermoegen von Aerosolfiltern fuer Atemschutzgeraete). Text in German. Staub, Reinhaltung Luft, 31(9):355-358, Sept. 1971.*

Filters in protective masks for aerosol retention are either made of a mixture of cellulose and glass fibers or of glass fiber alone. Mixed filters have a weight of 150 to 200 g/sq m, while glass fiber filters weigh only 60 to 100 g/sq m. The mixed filter papers have more rather larger pores than glass fiber papers. Thus it can be expected that the mixed filter papers retain more aerosols. The actual retention capacity of the two types of filters was tested with oil mist, soot, titanium dioxide, sodium chloride, and sand dust. The retention capacity of both filters was approximately the same. The different clogging properties of the various aerosols became apparent in the glass fiber filter as well as in the filter of mixed material. At the retention of sodium chloride and titanium dioxide which is representative of the separation of fine dusts, the particles penetrate rather deeply into the filter and a separation into coarse and fine particles takes place. A considerable difference between the retention capacity of a glass fiber filter and the filter of mixed material was found when the different size of the paper surface of the two filters is considered. The glass fiber filter has twice the surface of the filter of mixed material. Thus, the latter is capable of retaining about twice as much aerosols/sq cm surface than the glass fiber filter.

19583 APTIC NO. 38157

Smith, Richard D. and Dale A. Furlong

SMOG-FREE AUTOMOBILE AND METHOD OF OPERATING SAME. *(Combustion Power Co., Inc., Palo Alto, Calif.) U. S. Pat. 3,608,660. 12p., Sept. 28, 1971. 10 refs. (Appl. Feb. 3, 1969, 9 claims).*

A smog-free automobile is described which burns fuel and substantially pure oxygen, with spray water cooling the cylinder walls and pistons during exhaust. A dual combustion system is utilized, Otto cycle for cruise power and diesel cycle above cruise power. Water is recovered from the exhaust. The fuel can be pure hydrogen or liquid gasoline. With liquid gasoline, the oxygen input atomizes the gasoline, and with hydrogen fuel both hydrogen and oxygen can be produced by electrolysis, ideally utilizing nuclear electric generation for a complete smog-free operation. Gaseous material is stored in a plurality of high pressure vessels and, in the case of hydrogen fuel, with the pressure vessels at the rear of the auto. Separate sets of vessels are provided for cruise power supply and above cruise power supply, and valving is provided to use the opposite set of tanks in case fuel for one operation is exhausted. (Author abstract modified)

19584 APTIC NO. 38415

Smith, Walter J. and Earl Stafford

DEVELOPMENT OF A DRY FIBROUS FILTER. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 264 - 272. (May 3-5, Louis C. McCabe, ed.)*

The development of high-efficiency filter paper made in thin, low-resistance sheets from specially treated paper pulp and asbestos makes possible a degree of air cleaning in industrial operations never before attainable. The rate of air flow must be kept at a low level of about 5 linear feet per minute at a resistance of 1 in. of water. Performance testing is discussed, particularly filtration tests against atmospheric dusts using a high-speed impactor. Pre-cleaners or roughing filters should be used to extend the life of the paper filters. Filter construction, cost factors, and limitations under conditions of wetness and combustion are noted. Performance data for various kinds of dry fibrous media for atmospheric dust are given. The range of applications is increasing, particularly where even very low dust concentrations are undesirable as in hospitals and plants manufacturing photographic film and electronic equipment.

19585 APTIC NO. 38555

Soberski, George A.

VALVE FOR EVAPORATIVE LOSS CONTROL. *(Eaton Yale and Towne Inc., Cleveland, Ohio) U. S. Pat. 3,628,517. 6p., Dec. 21, 1971. 4 refs. (Appl. Dec. 16, 1968, 13 claims).*

An apparatus for evaporative loss control in an automotive engine is described which includes a single diaphragm-type valve which is operable in response to pressure differences between the atmosphere and the fuel tank. Previous devices employed at least two separate valves to channel the air and fuel vapors between the plurality of fuel reservoirs and the carburetor. Vapors are collected and returned to the fuel reservoirs for condensation after cool down of the system. (Author abstract modified)

19586 APTIC NO. 38051

Spector, Marshall L.

COMBUSTION OF HIGH-SULFUR COAL IN A FLUIDIZED BED REACTOR. *(Air Products and Chemicals, Inc., Allentown, Pa.) U. S. Pat. 3,625,164. 7p., Dec. 7, 1971. 4 refs. (Appl. April 21, 1971, 10 claims).*

Heating values can be recovered from sulfur-containing coal in a reactor which includes a gasification zone, a combustion zone, and a heat recovery zone. A fluidized bed of coal and limestone is maintained within the gasification zone, which is supported by a moving foraminous grate. Primary air, which is also the fluidizing medium, enters the gasification zone through the grate. The zone is operated adiabatically, under reducing conditions, to yield calcium sulfide and an effluent rich in carbon monoxide. The CaS is discharged from the gasification zone by the moving grate; the gaseous effluent, containing entrained desulfurized coal fines, enters the combustion zone where secondary air is added. Conventional techniques are used for the subsequent recovery of heat in the heat recovery zone. The CaS may be processed in several ways to recover elemental sulfur. (Author abstract modified)

19587 APTIC NO. 38650

Squires, Arthur M.

THE BINDING OF SULFUR AT THE POWER PRODUCTION. *(Die Bindung von Schwefel bei der Energieerzeugung). Text in German. Chem. Ing. Tech., 44(1+2):1-7, Jan 1972. 27 refs.*

All efforts for the desulfurization of waste gases from power plants lead to disappointing results. Thus, the interest now focuses on sulfur removal prior to the combustion process. The sulfur in oil and coal can be reduced by treatment with hydrogen under high pressure. An integration of the pressure desulfurization plant for fuel into a combined gas/stream turbine power production process seems to provide an economic solution to the desulfurization problem. Gasification and gas cleaning in one plant by means of a Lurgi pressure gasifier would cost about $32/installed kw based on the West German capacity requirements. Presently experiments are being conducted with fuel oil containing 2.2% sulfur which is desulfurized in a fluid lime bed. The sulfur is bound in form of calcium sulfide. A sulfur-free heating gas with a heating value of more than 2100 kcal/cu m is obtained. The fluid bed has 850 C and is under atmospheric pressure. For desulfurization of coal, a slagging gasifier where a diluted coal suspension is treated with steam and air is being tested. It is now sought to reduce the loss of 9% of latent heat and of 5% carbon encountered at the tests. Another possibility for solving the sulfur problem is provided by the pyrolysis of fuel at 700 to 800 C and increased pressure in presence of hydrogen and calcined dolomite.

19588 APTIC NO. 38002

Stahl, Johann

BOILER-HEAT. *(Kessel - Waerme). Text in German. Planen-Pruefen-Investieren, no. 3:28, 1971.*

The developing heat during refuse incineration has to be used or destroyed by heating warehouses or by blowing the heat into the open air by means of an air heater which may be alternated as a re-cooling device. One such possibility is that the re-cooling device is situated in a by-pass of the return line. This by-pass is opened if a predetermined temperature is reached and closed if the temperature decreases by means of a three-way valve. Instead of an air heater, other re-cooling devices can also be used such as a counter-current devices which may heat a swimming or cooling pool.

19589 APTIC NO. 38012

Steuernagel, Walter, Helmut Giles, Horst-Guenter Eishold, and Theo Wilhelm

DISCHARGE ELECTRODE FOR ELECTROSTATIC DUST COLLECTORS. *(Metallgesellschaft A./G. Aktiengesellschaft, Frankfurt (West Germany)) U. S. Pat. 3,616,608. 7p., Nov. 2, 1971. 11 refs. (Appl. July 8, 1969, 3 claims).*

A discharge electrode for an electrostatic dust collector is described which is prefabricated for shipment to the field construction site. It comprises pairs of spaced electrode strips attached to opposite sides of a mast. Deformation and warping of the previously used pipe discharge frames resulted in unequal voltage distances which caused troublesome flashing and spoiled collection efficiency. (Author abstract modified)

19590 APTIC NO. 38013

Stewart, Solomon L.

METHOD FOR TREATING AND PURIFYING AIR. *(Assignee not given.) U. S. Pat. 3,616,597. 3p., Nov. 2, 1971. 1 ref. (Appl. May 11, 1970, 6 claims).*

A method for treating and purifying air is presented wherein a series of spray treatments are provided for washing the air and delivering the resulting residue to various sump tanks. None of the present dust collectors and sludge separators have been satisfactory for cleaning and purifying the air over large sections of a city or that entering a given building complex when it is desirable to remove pollutants such as sulfur dioxide and carbon monoxide.

19591 APTIC NO. 37988

Stocchi, Virgilio, Antonio Cavraro, Carlo Morsiani, and Dario Vio

APPARATUS FOR SCRUBBING GASES. *(Montecatini Edison S.p.A., Milan (Italy)) U. S. Pat. 3,611,592. 7p., Oct. 12, 1971. 10 refs. (Appl. Nov. 4, 1969, 11 claims).*

All of the known scrubbing apparatuses possess various disadvantages, for instance, the substantial pressure drop exhibited by the gaseous stream while flowing through such devices. An improved scrubbing apparatus is described for separating vapors, liquids, and solid particles from a gas. A spout directs a full stream of the scrubbing liquid at a grid which comprises a multiplicity of spaced rods for forming films of the scrubbing liquid. The plane of the grid is transversely disposed with respect to the gas stream to be purified. The gas stream is passed through the films of scrubbing liquid for cleaning. (Author abstract modified)

19592 APTIC NO. 37872

Stone, Arthur F.

GAS SCRUBBERS. *(Air Pollution Industries, Inc., Englewood, N. J.) U. S. Pat. 3,618,908. 3p., Nov. 9, 1971. 5 refs. (Appl. June 10, 1969, 4 claims).*

A simple, inexpensive, and highly efficient structure is described for removing particulate matter from gas streams. The gas to be scrubbed is fed under pressure down the upright arm of an elbow shaped conduit and is intercepted by a curtain of water spray prior to its entrance into a horizontal arm. Water which overflows a circumferential weir drains down the wall of the upright arm. An adjustable damper controls the area of the passage immediately behind the water curtain. (Author abstract modified)

19593 APTIC NO. 38301

Stookey, Kenneth W.

COMBUSTION CHAMBER. *(Torrax Systems, Inc., North Tonawanda, N. Y.) U. S. Pat. 3,568,612. 6p., March 9, 1971. 4 refs. (Appl. Feb. 19 1969, 19 claims).*

The top burning of combustibles in bottom-blasted, vertical shaft furnaces can produce stratified and, therefore, incomplete combustion leading to the emission of gases, smoke, and particulates. Because of the stratification, the combustibles do not meet before they are cooled below their ignition point. An improved refractory-lined, vertical furnace with an open top provides for complete and controlled combustion of gases, solid fuels, and trash by the addition of secondary air and by the path of travel of the material in the chamber. The material is introduced at the top of the chamber and admixed with air, then ignited by pilot lights. As it burns, the material moves downward through the chamber. Gaseous combustion products are discharged from the side of the chamber near the bottom, while solid combustion products are withdrawn from the bottom of the chamber. A collection vessel for solids includes values for controlling the passage of material so that the chamber can be operated at sub-atmospheric pressure. At the top, the chamber is always at subatmosheric pressure, and the material to be burned is drawn in by suction. The apparatus can be employed with primary combustion chambers. (Author abstract modified)

19594 APTIC NO. 38270

Stotler, Harold H., Michael Calderon, and Clarence A. Johnson

LOW SULFUR FUEL OIL FROM COAL. *(Hydrocarbon Research, Inc., New York) U. S. Pat. 3,617,474. 4p., Nov. 2, 1971. 2 refs. (Appl. June 10, 1970, 9 claims).*

The economic production of low sulfur fuel oil by the hydrogenation of coal can be accomplished in an ebullated bed system without downstream processing and with a minimum of hydrogen to produce a fuel of high B.t.u. value and low sulfur content. Coal is appropriately ground and mixed with recycle slurry oil to form a coal-oil slurry. This slurry is passed through a heater into the lower part of a reactor and hydrogen is added. Liquid oil and hydrogen pass upward through a bed of catalyst or activated alumina at sufficient velocity to maintain an ebullated bed of catalyst or inert solids. (Author abstract modified)

19595 APTIC NO. 37802

Sultanov, M. Yu., G. I. Khain, S. N. Karganova, and M. S. Belenkiy

ALUMINUM-COPPER-CHROMIUM OXIDE CATALYST FOR PURIFYING WASTE GASES. *(Alyumo-medno-khromookisnyy katalizator dlya ochistki otkhodyashchikh gazov). Text in Russian. Khim. Prom. (Moscow), 46(6):443-444, June 1970. 5 refs.*

Comparative laboratory tests carried out on high-concentration aluminum-copper-chromium oxide catalysts and other catalysts for purifying waste gases from petroleum processing plants with carbon monoxide and hydrocarbon content are described. The high-concentration catalysts, composed of cylindrical granules of 3 mm by 4 mm, were tested with throughputs of 5000-50,000/hr in a temperature range of 120-500 C. No variations in activity were observed at an increased temperature of 900 C, with the reaction velocity constant. Such catalysts proved to be superior in activity to carrier type Al-Cu-Cr and platinum catalysts up to 200 C, and they were not inferior to the latter at higher temperatures. The activity increased with decreasing throughputs. Total oxidation of CO, butane, and benzene was reached at a concentration of 440 g/l and a throughput of 10,000/hr the respective temperatures ranges being 250-300 C, 400-450 C, and 450-500 C. The high-concentration Al-Cu-Cr catalysts were positively superior to industrial platinum catalysts, and were not inferior to corresponding carrier type catalysts. The aluminum oxide added to the granulated copper and chromium oxides increased the catalytic activity. The blending of the active mass was followed by granulation, gradual drying, and heating. The optimum catalysts strength was 15-20% of the residue on 50 micron-sieve. The catalysts showed fairly high strength for vibratory loads.

19596 APTIC NO. 38081

Summer, W.

ODOR SUPPRESSION WITH ACTIVATED OXYGEN. *(Geruchsbekaempfung mittels aktiven Sauerstoffs). Text in German. Luftverunreinigung, 1969:26-30, Oct. 1969.*

Odor counteraction to control or minimize the odors emitted by food and feed operations, e.g., fish oil and meal plants and slaughterhouses, and fertilizer manufacturing processes is examined. The odors may be abated by treatment with activated oxygen, various oxygen containing sources, e.g., air, ozone, chlorine, or water. The oxygen is activated by ultraviolet rays. The investment costs are determined by the volume of air to be treated and the odor intensity. Depending on the residence time, investment costs range within $9000-19,000/10,000 cu m/h. Operating costs are dictated by the amount of electric power needed to run the ultaviolet radiator.

19597 APTIC NO. 38645

Suzuki, Noboru, Morio Ito, and Yoshio Nakai

EXPERIMENTAL STUDY ON H2S GAS REMOVAL METHOD. *(H2S gasu jokyoho ni tsuiteno jikkenteki kenkyu). Text in Japanese. Shizuoka-ken Eisei Kenkyusho Nenpo (Annu. Rep. Shizuoka Pub. Health Lab.), vol. 15:155-158, Sept. 1969.*

Sludge dredged from the Tagonoura Port emits hydrogen sulfide and causes bad odors and the corrosion of metals, causing complaints by the local citizens. To cope with this problem, a basic experiment for the chemical removal of H2S gas was conducted. Absorption of H2S by an alkaline solution and oxidation of the absorbed H2S were studied. A 5% sodium hydroxide solution and 5% calcium hydroxide solution was used as the test absorbent. The absorption efficiency of these absorbents for H2S of different concentrations was also studied to find out that the absorbent should be of 1% or higher concentration if the concentration of H2S to be absorbed is higher. The H2S gas can be effectively absorbed either by the NaOH or the Ca(OH)2 solution, which can give 90% or higher removal efficiency at room temperature, provided a sufficiently excess amount of the same is used. Care should be taken to maintain the absorbent s alkalinity constant (1% or higher) and the quantity of the solution at sufficient volume level, taking into account shape of the absorption bottles, concentration of H2S gas, and absorption speed. Oxidation of H2S absorbed by the alkaline solution is achieved at room temperature in 30 min or less by adding hydrogen peroxide to the solution amounting to three times as much as the theoretical value.

19598 APTIC NO. 38600

Tamura, Yukio

MEASUREMENT OF DUST IN STACK AND DUST COLLECTION TECHNIQUE. *(Endo baijin no sokutei to shujin gijutsu). Text in Japanese. Preprint, Japan Petroleum Inst., Tokyo, p. 125-144. 9 refs. (Presented at the Lecture Meeting on Environmental Pollution Analysis and Auto Analysis, 13th, Tokyo, Japan, Nov. 10-12, 1971.)*

Measurement methods of dust in stack gas include the cylindrical filter paper sampler method, Ringelmann's analysis, and the photometric measuring method. Dust collection techniques include the venturi scrubber, the bluebird scrubber, the overflow disk type scrubber, and the bag filter. Various cooling methods of high temperature gas and various dust rapping mechanisms such as vibration, reverse pressure, reverse jet current, pulse jet, and ultrasonic vibration, are discussed. The wet and dry Cottrell electrostatic precipitators are also discussed. The cylindrical filter paper sampler is a simple device of filter papers and a filter paper holder of 25 by 90 phi. The insertion of a cylindrical glass fiber paper into the tapered tube behind the nozzle which holds it down eliminates the difficulty of packing the previously used dust tubes with glass fiber. According to experiments, when the flow velocity is less than 5 cm/sec, 99.9% of any particle size could be captured. The method of determining the flow quantity, nozzle size, and suction time are presented by formulas and tables. The bluebird scrubber was developed by a Japanese firm. The flue gas enters from the lower end of a vertical scrubbing tower at the speed of 15 to 25 m/sec. The tower is sectioned into six stages and the chamber on each stage has an entrance and exit on the opposite sides. This helps to form a spiral gas current as it moves upward, sucking the liquid in the tank at the bottom of the tower. The liquid also moves up in a spiral fashion and forms a thin film along the inner walls of the chambers. As the gas hits the liquid film, it creates an aerosol mixture of liquid and gas, and the gas is cleaned as it rises toward the top of the tower where a separation chamber and an exit are situated.

19599 APTIC NO. 37828

Tappan, William T., Jr.

PORTABLE AIR FILTER CLEANER. *(Tamonite, Inc., Albuquerque, N. Mex.) U. S. Pat. 3,604,437. 6p., Sept. 14, 1971. 6 refs. (Appl. May 26, 1969, 4 claims).*

A portable air filter cleaner is described which comprises a two or three stage washing and drying system. Air or liquid cleaning solvent may be sprayed onto the inside and outside of the filter while it is being simultaneously rotated for dry cleaning or wet cleaning. The system is constructed to be portable, occupying a minimum of space. (Author abstract modified)

19600 APTIC NO. 37908

Tatsutomi, Yasuo and Tomoo Tadokoro

DEVICE FOR CONTROLLING A SECONDARY AIR SUPPLY IN AN EXHAUST GAS PURIFYING DEVICE. *(Toyo Kogyo Co. Ltd., Hiroshima (Japan)) U. S. Pat 3,611,715. 4p., Oct. 12, 1971. 3 refs. (Appl. April 20, 1970, 5 claims).*

Conventional gas purifying devices have not provided means to vary the amount of air supplied to the gas purifying device. This is disadvantageous because if excess secondary air is supplied to the device at low engine speed or low vehicle speed, the temperature of the exhaust gas decreases with the result that the exhaust purifying device is hampered in removing the unburned detrimental components. The durability of the exhaust gas system also becomes extremely low if excess secondary air is supplied to the system upon high engine speed or high vehicle speed. A device is described for controlling a secondary air supply in an aexhaust gas purifying system which has an air pump driven by an internal combustion engine. This pump is connected to an exhaust gas system of an engine by a first conduit having a check valve means. A second conduit is connected to the first conduit between the check valve and the air pump at one end and to the atmosphere at the other end. A valve in the second conduit operates in response to the engine or vehicle speed, and thereby controls the secondary air supply to the exhaust gas system in cooperation with the check valve by providing a bypass to the check valve. An auxiliary passage is provided in the valve for communicating between the second conduit and the atmosphere, while an auxiliary valve having a larger resilient closing force than that of the check valve is provided for closing the auxiliary passage if the pressure in the conduit passes a predetermined value.

19601 APTIC NO. 38538

Tatsutomi, Yasuo and Yoshihiro Kajiwara

RECOMBUSTION APPARATUS FOR ENGINE EXHAUST. *(Enjin no sainensho sochi). Text in Japanese. (Toyo Kogyo Co., Ltd., Hiroshima (Japan)) Japan. Pat. Sho 47-1136. 3p., Jan. 12, 1972. (Appl. April 7, 1969, 2 claims).*

The invention consists of a quadruple wall recombustion room in the automotive engine in which thermal expansion of the inner wall will not interfere with the outer wall or the insulated area. It also separates the exhaust pipe from the inner and outer walls so that the thermal deformation of the pipe will not cause cracking or rupture of joints of the inner wall of the recombustion room. The outer edges of the upper inner wall and the lower inner wall of the recombustion room are welded and the axis pipe and supporting axis are installed just at the joined edge. The outer edges of the upper outer wall and the lower outer wall are welded together with the supporting pipe and the supporting pieces. Thus the axis pipe and the supporting pipe are locked, and the supporting axis and the supporting piece are interlocked. The exhaust pipe is inserted through the flange, through the upper outer wall, and through the upper inner wall. The exhaust gas from the engine will enter the recombustion room and burn. The gas will go out and escape through the passage between the upper and lower passes between the inner and the outer wall, toward the axis pipe. There is a space between the outer wall and the inner wall of the insulation space which envelopes the entire structure.

19602 APTIC NO. 37815

Taylor, James A.

PROCESS FOR RECOVERING SULFUR DIOXIDE. *(Wellman-Lord, Inc., Lakeland, Fla.) U. S. Pat. 3,607,038. 4p., Sept. 21, 1971. 3 refs. (Appl. Dec. 24, 1968, 10 claims).*

An improvement is described in the process for recovering sulfur dioxide from waste gases by contacting the gases with an aqueous solution of a metal sulfite such as potassium, cesium, or rubidium sulfite to produce the corresponding bisulfite, recovering the bisulfite from the solution as the corresponding pyrosulfite, and then treating the pyrosulfite to produce sulfur dioxide. In the new procedure, the metal bisulfite is recovered from its aqueous solution in the form of the corresponding metal pyrosulfite by mixing methanol or ethanol with the aqueous solution to crystallize out the bisulfite.

19603 APTIC NO. 37833

Terrana, Jack D., Leo A. Miller, and James A. Taylor

SEPARATION OF SULFUR DIOXIDE FROM GASES. *(Wellman-Lord, Inc., Lakeland, Fla.) U. S. Pat. 3,607,037. 10p., Sept. 21, 1971. 9 ref (Appl. Dec. 20, 1968, 28 claims).*

According to one existing practice, sulfur dioxide can be recovered from gases containing 5-20 weight percent SO_2 by cooling and scrubbing the gas with water which dissolves the SO_2 and by then heating the resulting solution to drive off the noxious gases. This process requires large quantities of water and fuel and is correspondingly expensive, since the solubility of SO2 in water is not very high. Small concentrations of SO2 can be recovered from waste gases by contacting the gas with aqueous sodium, lithium or beryllium sulfite to produce sodium, lithium, or beryllium bisulfite. The sulfite is then separated to lower the SO2 partial pressure in the bisulfite which can be decomposed to release SO2. (Author abstract modified)

19604 APTIC NO. 38063

Terrana, Jack D. and Leo A. Miller

PROCESS EMPLOYING POTASSIUM SULFITE FOR RECOVERING SULFUR DIOXIDE FROM GASES CONTAINING SAME. *(Wellman-Lord, Inc., Lakeland, Fla.) U. S. Pat. 3,615,198. 10p., Oct. 26, 1971. 5 refs. (Appl. May 15, 1969, 17 claims).*

Sulfur dioxide can be recovered from waste gases by contacting the gases with aqueous potassium sulfite to produce potassium bisulfite. The bisulfite and SO2-partial pressure lowering materials are subsequently separated to obtain purer potassium bisulfite or potassium pyrosulfite which can be decomposed to release SO2. Processes which recover SO2 by cooling and scrubbing the waste gases with water, and then heating the resulting solution, require large quantities of water and fuel and are correspondingly expensive. (Author abstract modified)

19605 APTIC NO. 38310

Terrana, Jack D. and Leo A. Miller

PROCESS FOR RECOVERING SO2 FROM WASTE GASES. *(Wellman-Lord, Inc., Lakeland, Fla.) U. S. Pat. 3,627,464. 15p., Dec. 14, 1971. 29 refs. (Appl. Nov. 9, 1967, 25 claims).*

The process and apparatus for the recovery of sulfur dioxide from SO2-containing gases are presented. The gas is brought into contact with an aqueous sulfite solution to produce a solution of the corresponding bisulfite which is a precursor of SO2. The bisulfite and SO2 partial pressure lowering materials are subsequently separated to obtain purer bisulfite which is then decomposed to regenerate SO2. Potassium, cesium, and rubidium sulfites may be used. Separation of the bisulfite is accomplished by vaporization of water from the bisulfite-containing solution in a flash chamber to supersaturate the solution and precipitate the bisulfite in an amount equal to that of the SO2 removed from the waste gases. Conditions for precipitation are determined by the crystal size desired for vacuum drum filtering. The crystals are advantageously redissolved prior to heating to regenerate the SO2, and part of the solution is used to wash the crystals on the drum filter for improved purity. (Author abstract modified)

19606 APTIC NO. 38441

Terrana, Jack D. and Leo A. Miller

PROCESS AND APPARATUS FOR PURIFYING GAS. *(Wellman-Lord, Inc., Lakeland, Fla.) U. S. Pat. 3,615,199. 17p., Oct. 26, 1971. 14 refs. (Appl. Nov. 9, 1967, 17 claims).*

An apparatus and a method are presented in which the problem of the crystallization or precipitation of salts from the solution within a reactor, and the consequent plugging of the contact trays, is alleviated. This system applies to the reaction between components, such as sulfur dioxide, in a gas and a salt solution. The apparatus includes a reaction zone having at least one or more contact trays which are sprayed from beneath with an aqueous salt solution, e.g., sulfite solution. An entrainment zone above the trays can be used involving a woven mesh contact material which is sprayed from both sides with the salt solution to remove entrained materials from the gas leaving the reactor. Also, particulate solid or liquid-soluble gaseous contaminants can be removed from the gas before contacting it with the sulfite solution by contacting it with a fluid permeable, impingement target in the presence of a concurrently flowing liquid stream which is also contacting the target. It is desirable to prevent plugging of the gas inlet opening to the reactor by using a bonnet arranged over the gas inlet. (Author abstract modified)

19607 APTIC NO. 38275

Thompson, William H. and Eldred E. Young

REMOVAL OF ELEMENTAL SULFUR CONTAMINANTS FROM PETROLEUM OILS. *(Shell Oil Co., New York) U. S. Pat. 3,617,529. 3p., Nov. 2, 1971. 3 refs. (Appl. March 17, 1969, 2 claims).*

Elemental sulfur can be separated effectively from crude oil and petroleum fractions which contain from 0.3-5% elemental sulfur by contacting the contaminated oils with an aqueous solution containing a mixture of sodium hydrosulfide and ammonium hydroxide. The oil phase is separated from the aqueous phase, and the aqueous phase is heated at about 240 F to form elemental sulfur. The aqueous phase is filtered after cooling to recover sulfur. The presence of sulfur in petroleum oils causes corrosion, objectionable odors, and air pollution. (Author abstract modified)

19608 APTIC NO. 37873

Toda, Tadahide, Mitsumasa Yamada, and Hidekatsu Miyake

EVAPORATION-INHIBITING DEVICE FOR A CARBURETOR. *(Toyota Jidosha Kogyo Kabushiki Kaisha (Japan)) U. S. Pat 3,618,909. 9p., Nov. 9, 1971. 6 refs. (Appl. April 30, 1969, 3 claims).*

A device is presented for inhibiting the evaporation of fuel from a carburetor, thus preventing the release of unburned hydrocarbons. The device comprises a variable capacity bag which communicates with a float chamber in the carburetor, the internal volume of which can be varied by an operating device according to whether the engine is running or stopped. A first one-way valve is positioned between the bag and the float chamber, while the bag is connected to a fuel supply line located upstream of a fuel pump through a second one-way valve. A certain amount of the fuel in the float chamber is introduced into the sealed variable capacity bag outside of the float chamber when the engine is stopped to minimize the amount of fuel in the float chamber, thus inhibiting the evaporation of fuel and the release of unburned hydrocarbons. (Author abstract modified)

19609 APTIC NO. 38623

Tooker, Robert Seaman and James Joseph Dawson

VACUUM OPERATED IGNITION TIMING CONTROL FOR MOTOR VEHICLES. *(Vorrichtung zur unterdruckabhaengigen Verstellung des Zuendzeitpunktes von Brennkraftmaschinen). Text in German. (General Motors Corp., Detroit, Mich.) W. Ger. Pat. Appl. 2,015,487. 5p., March 25, 1970. 2 refs. (3 claims).*

The design for a vacuum operated ignition timing control for motor vehicles is presented. The device reduces the pollution level of the exhaust gases in low gear operation, reduces fuel consumption, and enhances smoother operation in the higher gears. The valve is fitted into the piping between the inlet manifold and the timing diaphragm and closes for low gears or opens for high gear operation.

19610 APTIC NO. 38569

Toro, R. F., J. Magder, and A. T. Goding

REMOVAL OF SULFUR DIOXIDE FROM WASTE GASES BY REDUCTION TO ELEMENTAL SULFUR. (FINAL REPORT). *Princeton Chemical Research Inc., N. J.f National Air Pollution Control Administration Contract PH 88-68-48, 295p., July 30, 1969. 70 refs.*

NTIS: PB 200071

Sulfur dioxide removal from waste gases by the modified Claus process is examined with respect to the technology, operating conditions, catalyst atctivitey,,;, effects of flue gas composition hydrogen sulfide generation, reactor and process design, and investment and operating costs. The SO2 is catalytically reduced in one step to elemental sulfur, using H2S which is generated by the one step reaction of elemental sulfur with natural gas and water. The reduction and sulfur collection are performed near normal flue gas temperature. Concurrent removal of nitrogen oxides is thermodynamically possible through reduction to nitrogen by reaction with H2S. The recovery of elemental sulfur as 5a by-product and low investment and operating costs are advantages with respect to economics. The process may be adapted for use in fossil fuel power plants, metallurgical roasting plants, oil refinerites, sulfuric acid plants, Claus sulfur plants, ane pulp and paper manufacturing.

19611 APTIC NO. 38225

Turnock, Philip Hain, Max Nai Yuen Lee, and Krishan Dayal Manchanda

DESULFURIZATION BY SELECTIVE ADSORPTION WITH A CRYSTALLINE ZEOLITIC MOLECULAR SIEVE. *(Union Carbide Corp., New York) U. S. Pat. 3,620,969. 7p., Nov. 16, 1971. 6 refs. (Appl. Oct. 15, 1969 3 claims).*

An improved process for removing sulfur compounds, particularly hydrogen sulfide and the alkyl mercaptans, from liquid hydrocarbon streams such as gasoline and fuel oils is presented. The sulfur compounds are adsorbed on nautral or synthetic crystalline zeolitic aluminosilicates and periodically desorbed using a hot purge gas e.g., steam, having a high water content. The adsorbent is regenerated to the point that 2-5% by weight of water remains adsorbed on the zeolite. (Author abstract modified)

19612 APTIC NO. 37966

Vecchio, V. del, P. Valori, C. Melchiorri, and A. Grella

AROMATIC POLYCYCLIC HYDROCARBONS (APH) IN EXHAUST GASES EMITTED BY MOTORS FUELED BY GASOLINE AND BY LIQUEFIED GAS. II. PROBLEMS PRESENTED BY THE CONTROL OF EMISSIONS AND BY THE PROTECTION OF THE WORK ENVIRONMENT. *(Idrocarburi policiclici aromatici nei gas di scarico di motori alimentati a benzina e a gas liquido. Nota II. - Problemi relativi al controllo delle emissioni ed alla prevenzione in ambienti di lavoro). Text in Italian. Nuovi Ann. Igiene Microbiol. (Rome), 20(3):193-207, May-June 1969. 55 refs.*

Experiments were performed to determine the effectiveness of a catalyst of undisclosed nature on the emission of aromatic polycyclic hydrocarbons by internal combustion engines when fueled by gasoline and by liquefied gas. Exhaust gases were analyzed and concentrations of various aromatic polycyclic hydrocarbons (APH) were expressed in micrograms/100 cu m exhaust gas. The catalyst had only a slight overall effect in the case of gasoline except for naphthalene (46% reduction), fluorene (19.6% reduction), anthracene (38.9%), and antanthrene (48.5%). When liquefied gas was used, the redution of APH emissions fluctuated from 54.6% (naphthalene) to 91.8% (antanthrene). In the latter case, the effect was even greater with an idling engine from a minimum of 82.9% for fluoranthene to 98.4% for antanthrene. Thus the median reduction achieved by the application of a catalyst to primary combustion was in the case of gasoline 26%, and in the case of liquefied gas 86.7%. The various hydrocarbons determined included naphthalene, fluorene, phenanthrene, pyrene, 4-methylpyrene, fluoranthene, benzofluoranthene, 1,2-benzanthracene, chrysene, perylene, 3,4-benzopyrene, 1,2-benzopyrene, 3,4-benzofluoranthene, antanthrene, 1,12-benzoperylene, and coronene. The content of 3,4-benzopyrene in exhaust gases was, in the case of gasoline, reduced by the catalyst from 2000 micrograms/100 cu m to 1825.5 micrograms/100 cu m; in the case of liquefied gas from 1097.3 micrograms/100 cu m to 177.9 micrograms/100 cu m. The hygienic implications of these findings are discussed.

19613 APTIC NO. 38008

Vincent, James Henry

MULTISTAGE ELECTROSTATIC PRECIPITATOR. *(American Standard Inc., New York) U. S. Pat. 3,616,606. 5p., Nov. 2, 1971. 9 refs. (Appl Feb. 25, 1969, 4 claims).*

An electrical precipitator is described which is composed of two tandem electrostatic sections arranged to eliminate dust or dirt or any form of particulate matter which may be conveyed with air or gas or any other fluid medium. The first section may include one or more pairs of positively charged vertical plates between each pair of which are positioned a plurality of negatively charged vertical wires, so that a corona discharge may be created between the vertical wires and the two parallel plates of each pair. The second section, which is contiguous to the end of the first section, includes a plurality of grids which are parallel to each other, but perpendicular to the plates of the first section. The first grid of the second section may be charged to a positive potential, while the remaining grids are arranged in different charged formations so that particles of matter entering the second section will be urged to turn back for the particles to be collected and removed from the fluid medium. (Author abstract modified)

19614 APTIC NO. 37906

Vins, Ludek

NEW DESIGN OF EQUIPMENT FOR GAS SCRUBBING BY MEANS OF LIQUID NITROGEN. *Czech. Heavy Ind. (Prague), no. 2:2-7, 1972.*

Gas scrubbing with liquid nitrogen is a known procedure for the final purification of the gas in the manufacture of the nitrogen-hydrogen mixture for ammonia synthesis. In the manufacture of ammonia on the basis of coal, the coal is gasified by means of oxygen at atmospheric pressure. The gas formed is cooled, compressed to about 30 bar, and is scrubbed with methanol to free the hydrogen sulfide. The gas is then subjected to conversion of carbon monoxide. The subsequent scrubbing of gas with methanol removes carbon dioxide to such an extent that the gas at a temperature of -50 C can be directly introduced into the equipment for gas scrubbing with liquid nitrogen. The inlet gas then passes through an adsorber where the residual methanol and nitrogen oxides are removed, is cooled by the nitrogen-hydrogen mixture, and enters the column for scrubbing with liquid nitrogen. Complete operational procedures, design criteria, and efficiency of the system are reviewed. This system can also be used in the manufacture of hydrogen from heavy oils and in the manufacture of a nitrogen-hydrogen mixture from coke-oven gas.

19615 APTIC NO. 38128

Wagner, Wayne M.

LIQUID-ATTENUATED EXHAUST SYSTEM. *(Donaldson Co., Inc., Minneapolis, Minn.) U. S. Pat. 3,630,030. 6p., Dec. 28, 1971. 10 refs. (Appl. Feb. 9, 1970, 6 claims).*

An apparatus and method are presented for injecting droplets of a liquid such as water into the exhaust pipe of an internal combustion engine, passing the mixture of exhaust gases and liquid droplets through a muffler, and removing the liquid from the exhaust gases and cooling and recirculating the liquid. The liquid droplets mixed with the exhaust gases greatly decrease the exhaust noise, cool the exhasust gases, and remove substantial quantities of solid particles. (Author abstract modified)

19616 APTIC NO. 38009

Warner, John Gl

DECOMPOSABLE FILTER MEANS AND METHOD OF UTILIZATION. *(Sylvania Electric Products Inc., Seneca Falls, N. Y.) U. S. Pat. 3,616,603. 2p., Nov. 2, 1971. 11 refs. (Appl. Nov. 21, 1969, 4 claims).*

A decomposable filter is provided for collecting water insoluble particles of gas-borne materials. The filter comprises a formed filter medium of water soluble organic material with structural stability in an environment having an ambient relative humidity of less than 90% and an ambient temperature under 100 C. The material can be selected from the group consisting of polyvinyl alcohol, methyl cellulose, carboxyethyl cellulose, carboxymethyl cellulose, hydroxyethyl cellulose, hydroxymethyl cellulose, and polyethylene oxide. The filter medium is oriented in a position to facilitate passage of the moving gas. The particles retained therein are reclaimed by dissolving the filter in water. (Author abstract modified)

19617 APTIC NO. 38287

Welbergen, Johannes

OPTIMUM SOLUTION OF THE PROBLEM AUTOMOBILE EXHAUST GAS DECONTAMINATION THROUGH UNLEADED FUEL. *(Optimale Loesung des Problems der Kfz-Abgasentgiftung ist der bleifreie Kraftstoff). Text in German. Erdoel Kohle (Hamburg), 24(11):713-715, Nov. 1971. (Presented at the Deutschen Akademie fuer Verkehrswissenschaft, Internationalen Verkehrswissenschaftlichen Kolloquium, Hamburg, West Germany, Oct. 18, 1970.)*

Traffic contributes 60% of the total pollutant emissions. The Federal Republic of West Germany had 15.1 million passenger cars in 1971. This number will rise to 17.4 million cars in 1975 and to 19 million cars in 1980. The total carbon monoxide from cars will be 8 million tons for 1969. The passenger cars alone emitted more than 5 million tons of pollutants in 1970. A first step toward reduction of such emissions would be monitoring of the carburetor adjustment. Development of the conventional carburetor including the suction system should be contemplated. Such measures are only of a temporary nature, however. For a long-range solution of the problem the following measures seem to be quite promising: thermal reactors for the oxidation of CO and hydrocarbons plus waste gas return for prevention of high nitrogen oxide concentrations; a thermal reactor plus a catalyst for reduction of NOx in the exhaust gas; a thermal reactor plus a catalyst for oxidation of CO and CH plus exhaust gas return; oxidation catalyzation plus exhaust gas return; and a two-bed catalyst plant for reduction and oxidation. The fully catalytic exhaust gas treatment plus the use of unleaded gasoline is the solution with the lowest costs. The investment costs would cost the consumer $120, the current costs are $50/yr.

19618 APTIC NO. 38637

Welty, Albert B., Jr., Anantha K. S. Raman, and Carl M. Lathrop

PROCESS FOR THE PURIFICATION OF FLUE GAS. *(Esso Research and Engineering Co., Linden, N. J.) U. S. Pat. 3,615196. 9p., Oct. 26, 1971. 7 refs. (Appl. May 5, 1969, 8 claims).*

Sulfur dioxide can be removed from flue gas by contacting the flue gas with a vanadium pentoxide absorbent, then passing air over the absorbent to cause desorption of sulfur trioxide. The reaction may be carried out in a rotating reactor containing a plurality of beds of absorbent. Another process which utilizes a vanadium pentoxide catalyst to oxidize sulfur dioxide to the trioxide, condenses the latter to sulfuric acid mist and has the disadvantage that the sulfuric acid causes corrosion problems. (Author abstract modified)

19619 APTIC NO. 38248

Wennerberg, Arnold N.

SEQUENTIAL, FIXED-BED HYDRODESULFURIZATION SYSTEM. *(Standard Oil Co., Chicago, Ill.) U. S. Pat. 3,598,535. 4p., Aug. 10, 1971. 4 refs. (Appl. Aug. 15, 1968, 10 claims).*

The removal of sulfur from low boiling petroleum fractions is not difficult, but as the boiling point increases, the difficulty of desulfurization likewise increases. It is generally more difficult to desulfurize a naphthenic molecule than a paraffinic molecule, and still more difficult to desulfurize an aromatic molecule. Consequently, although suitable desulfurization methods are available for use with light and intermediate petroleum stocks, an improved hydrodesulfurization process is needed for treating the heavier petroleum stocks. An apparatus for the hydrodesulfurization of sulfur-containing hydrocarbons is described, wherein the hydrocarbon is reacted in a first stage with hydrogen in the presence of a hydrogen transfer catalyst to produce hydrogen sulfide, and the H2S so produced is reacted with an alkaline material in a second stage to produce a solid phase sulfide before it can combine with the desulfurized hydrocarbons. (Author abstract modified)

19620 APTIC NO. 38269

Wiklund, Johan Elof

PROCESS FOR REPRESSING SULFUR TRIOXIDE FORMATION IN IRON SULFIDE ROASTING. *(Boliden Aktiebolag, Stockholm (Sweden)) U. S. Pat. 3,617,255. 2p., Nov. 2, 1971. 7 refs. (Appl. April 25, 1968, 1 claim).*

A process is presented for reducing the formation of sulfur trioxide in roaster gases when roasting pyrites in a fluidized bed. The roasting is conducted at such low oxygen partial pressure that the roasted product is present completely or partly as magnetite, with elementary sulfur appearing in the roaster gas in large or small amounts. The process comprises the step of introducing an oxygen-containing gas into the roaster gas for combustion of elementary sulfur at a gas temperature of below 420 C but not below the temperature at which the sulfur content of the roaster gas begins to condensate. (Author abstract modified)

19621 APTIC NO. 38381

Willett, Howard Parker

PROCESS FOR CONTROLLING THE FLUE GAS FLOW IN TOP-BLOWN CONVERTERS. *(Verfahren zur Steuerung des Abgasstromes bei Sauerstoffaufblaskonvertern). Text in German. (Chemical Construction Corp., New York) W. Ger. Pat. 1,922,614. 14p., Oct. 14, 1971. 1 ref. (Appl. May 2, 1969, 3 claims).*

Controlled flue gas composition during the total blow period, and particularly during the main blow period, is obtained by admitting air to the flue gas above the converter during the total blow period. The flue gas is drawn out by a fan across the dust separating, washing, and cooling sections. The flow is controlled at a definite point before the fan by a flow control unit of variable cross-section area. The latter is set by a measuring section behind the dust separating, washing, and cooling sections for a dry gas flow to allow for the fan to maintain a constant dry gas flow. The measuring section compensates for the water content, and controls a variable cross-section area of the venturi scrubber in the wash zone. A gas drying section is incorporated in the cooling section. The flow metering is made by measuring the fan performance, and a flap before the fan is controlled accordingly. In this process, flue gases partially burned in a controlled and predetermined manner are drawn out either at a constant flow rate or with constant volume. The stoichiometric ratio is reached before the main blow period. The initial gas mixture rich is oxygen is cut from the gas mixture rich in carbon monoxide formed during the main blow period by inert gas surges (primarily carbon dioxide, nitrogen, oxygen, or carbon monoxide).

19622 APTIC NO. 38408

Witheridge, William N.

ODOR CONTROL PRACTICES. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 251 - 258. (May 3-5, Louis C. McCabe, ed.)*

Procedures for counteracting odors in outdoor atmospheres where malodorous compounds are released in the effluent gas include dilution, masking, combustion, sorption, filtration, and use of scrubbers and separators. Requisites for preventing objectionable odor concentrations in ambient air include effective enclosure of the odor source and high-quality maintenance of all odorous process equipment. The degree of gas cleaning needed for odor control is often far greater than that demanded by conventional dust and mist collection equipment, with consequent higher costs. Stack gas sampling and performance testing by continuous recording instruments have the necessary degree of specificity and sensitivity are important in developing improved gas cleaning processes for odor control.

19623 APTIC NO. 38587

Wolfram, Walter

DEVELOPMENT OF A NEW FLUORINE ABSORPTION PROCEDURE FOR THE REMOVAL OF SILICON TETRAFLUORIDE FROM SUPERPHOSPHATE PLANT WASTE GASES. *(Die Entwicklung einer neuartigen Fluorabsorption fuer die Abscheidung des Silizium-tetrafluorids aus den Abgasen von Superphosphatanlagen). Text in German. In: Technik und Umweltschutz Luft-Wasser-Boden-Laerm. Kammer der Technik, Brennstofftechnische Gesellschaft in der Deutschen Demokratischen Republik (ed.), Leipzig, VEB Deutscher Verlag fuer Grundstoffindustrie, 1972, p. 75-89. 18 refs.*

Maximum separation of silicon tetrafluoride from the waste gases of superphosphate plants is required. The actually used fluorine absorption equipment such as spray towers, spray chambers, or combinations fail to comply with the requirements of modern air hygiene. To obtain commercially utilizable waste products with efficiencies above 99.5%, a fully continuous and automatic fluorine absorber with a modified lattice bottom was developed and tested at the Coswig plant of VEB Stickstoffwerk Piesteritz (East Germany). Here, silica and silicofluoric acid are discharged continuously, and large phase contact area is provided. Thermodynamic and kinetic problems of silicon tetrafluoride absorption were studied, and single-stage absorption was sufficient for a silicofluoric acid concentration of 17%. The absorber consists of a round, rubber-lined steel tower with bottom inlet for the waste gases with fluorine concentrations of 8-12 g/cu m. The gas passes through four consecutive lattice bottoms made of brass, at a rate of 25,000 cu m/hr. The silicofluoric acid formed drops down through the bottoms at a rate of 800 l/min and sq m of tower cross-section area. A stable dynamic layer of 120 mm thickness is formed upon the bottoms, providing a large contact area. The water consumption is 1-1.5 cu m/hr. The silicofluoric acid is obtained in a concentration of 15.17% hydrogen while the purified gas contains fluorine in a concentration of 20-30 mg/cu m. The pressure drop within the absorber lies at 70-80 mm of water column. An automatic concentration control is planned. The pilot equipment has been operating successfully for 2 yrs.

19624 APTIC NO. 38564

Womann, Heinz

EXPERIENCES WITH THE INCINERATION OF INDUSTRIAL REFUSE AT BASF. *(Erfahrungen mit der Verbrennui von Industrieabfaellen in der BASF). Text in German. Energie, 23(11):366-369. Nov. 1971. 3 refs.*

The BASF incineration plant at Ludwigshafen consists of a grate furnace and four rotary shaft furnaces. In the grate furnace with a heat boiler and an additional combustion chamber, 200,000 tons of solid waste and 37,000 tons of liquid refuse have been burned producing 1.1 million tons of steam at 20 atm and 270 C. In an electrical filter, the flue gases are dedusted down to a dust content of less than 50 mg dust/N cu m. In two rotary shaft furnaces with one combustion chamber and two waste heat boilers, solid refuse with a heating value of 5,000 to 10,000 kcal/kg is burned. The developing flue gases are cooled down to 350 C. Two other rotary shaft furnaces have been constructed with one post-combustion chamber each where the flue gases are completely burned at a temperature of 1,000 to 1,500 C. The flue gases heat a boiler for steam production and leave it at a temperature of 330 C.

19625 APTIC NO. 38059

Wright, Nelson R.

AFTERBURNER. *(Environmental Control Sales Crop., Oklahoma City, Okla.) U. S. Pat. 3,606,611. 6p., Sept. 20, 1971. 6 refs. (Appl. Oct. 24, 1968, 10 claims).*

An afterburner is presented for attachment to stacks and flues for the purpose of burning residual products of incomplete combustion. It comprises an elongated titanium inner sleeve concentrically surrounded by a shorter metallic outer sleeve with a thermal insulating material positioned between the inner and outer sleeves. A pair of damper plates are located in the upper and lower ends of the inner sleeve, and are movable to selected positions of closure within the inner sleeve. A burner is secured to the side of the inner sleeve at a location above the lower damper plate, and is constructed to burn a mixture of fuel and air and to direct the flame in a generally tangential direction into the lower end of the inner sleeve. A pair of vertically spaced, circumferentially staggered, semi-circular baffle plates are secured within the inner sleeve at a location above the burner. They function to impart a spiralling or helical motion to gases moving upward in the inner sleeve. This invention can withstand the elevated temperatures needed to complete combustion better than prior afterburners. It is also lightweight and economic. (Author abstract modified)

19626 APTIC NO. 38665

Yamasaki, Gosei

FACTORY EXHAUST CLEANING APPARATUS. *(Koho haiki joka sochi). Text in Japanese. (Assignee not given.) Japan. Pat. Sho 46-40992. 2p., Dec. 3, 1971. (Appl. April 1, 1969, 1 claim).*

A water tank is installed midway between the gas emission source of any type and the stack as part of the flue. The open surface of the water faces the flue gas. A large wheel with wide guide vane spokes is installed in the water tank so that half of it will be exposed to the flue gas. The guide vanes are made of micromesh refractory corrosion resistant metal screen, and as they turn, the mesh with the thin film of water catches dust, soot and cleanses the toxic gas. The width of the guide vanes covers the entire width of the flue, and the flue gas cannot escape filtering through the mesh. High pressure air is supplied through the axial pipe of the wheel and goes into the water through small pores, creating bubbles and washing the dust and soot off the guide vanes as they turn through the water. The soiled water is constantly eliminated through a pipe, and clean water is supplied through another pipe. If the exhaust gas still contains toxic elements after filtering through, part of exhaust going to the stack can be recirculated for recombustion. However, most of factory flue gas can be treated effectively by this means.

19627 APTIC NO. 38662

Yamasaki, S, S. Iwamoto, and M. Nishikawa

VENTILATION AND DUST COLLECTION DEVICE FOR THE OXYGEN INJECTION CONVERTER. *(Sansojosui tenro rochobu ni okeru kanki shujin hoho). Text in Japanese. (Yokoyama Engineering Co., Ltd., Tokyo (Japan) and Yahata Ironworks, Tokyo (Japan)) Japan. Pat. Sho 46-11407. 2p., March 23, 1971. (Appl. May 15, 1967, 1 claim).*

The invention is designed to increase the ventilation capacity of the dust collector used for the oxygen injection converter without the use of a large ventilation capacity collector. The apparatus consists of an oxygen injection converter, a gas recovery flue, the primary and the secondary dust collectors collected with the flue, a fan at the end of the flue, a ventilation hood, the main ventilation duct, a ventilation-dust collector and a pipe leading to another fan, a branch duct which joins the main ventilation duct by a three way valve box, and a gas flow resistance adjuster which regulates the gas flow resistance in the recovery flue and the branch duct. When pig iron is supplied to the converter, the dusty gas created is collected in the hood and goes to the ventilation-dust collector through the main duct. The gas flow resistance in the adjuster is adjusted so that the gas flow in the first dust collector is interrupted. Therefore the dust containing gas at the time of the initial supply is treated by the ventilation-dust collector and the secondary dust collector, which improves the ventilation capacity a great deal. When the operation is continued and the converter is vertical and oxygen is injected, by manipulation of the adjuster, the internal pressure of the lower part of the flue is controlled. This prevents the suction of the gas from the converter and decreases the amount of dust. At this point, the ventilation-dust collector of the main duct is sufficient. By operation of the gas flow resistance adjuster and the use of the branch duct and the recovery flue, the gas flow can be regulated and an effective dust collection can be achieved.

19628 APTIC NO. 37800

Yanagihara, Shigeru

COUNTERMEASURE FOR AUTOMOTIVE EXHAUST NITROGEN OXIDES. *(Jidosha haiki no chisso sankabutsu taisaku). Text in Japanese. Preprint, Fuel Society of Japan, Tokyo, p 2-5, 1971. (Presented at the Fuel Society of Japan, Lecture Meeting on Nitrogen Oxides, Sept. 1971.)*

The combustion gas of an internal combustion engine often reaches a temperature higher than 2000 K and the chances for the formation of nitrogen oxides are great. The nitric oxide concentration in the exhaust is between 100 ppm and 5000 ppm. The NO concentration is gas turbine exhaust is between 10 to 20 ppm, but the ratio of formation is rather high for the amount of the energy output. The formation of NO in an internal combustion engine is relatively quick, and the concentration approaches 1/2 nitrogen plus 1/2 oxygen, but this reaction speed is extremely slow. The more damaging reactions are N2 plus) to NO plus N, which is slow, and 02 plus N to NO plus 0, which is extremely quick, although the concentration of nitrogen is small. In these reactions, once NO is formed, its decomposition is extremely slow, and after the formation reaches the maximum, the value stays frozen until it is emitted. Catalytic treatment of NO, if limited to N2, 02, or carbon dioxide is not impossible, but the reduction in an oxidized atmosphere is rather difficult. Some methods for controlling NO formation are as follows: delaying of ignition or fuel injection time, reshaping of the combustion room to delay combustion, and especially its initial stage; changing of air/fuel ratio to minimize oxygen concentration or lowering combustion temperature; recirculation of exhaust gas or lowering of the highest combustion temperature by water jet or inactive gas; or avoiding a high oxygen concentration in the high temperature area of the combustion chamber either by changing the shape of the chamber or using internal circulation of the gas.

19629 APTIC NO. 38414

Yellott, John I. and Allan Bralove

CONDENSATION TECHNIQUES FOR DUST DETECTION AND COLLECTION. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 330F-340. 8 refs. (May 3-5, Louis C. McCabe, ed.)*

The physical aspects of the condensation of moisture on minute dust particles, making such particles both visible and collectible, and of related supersaturation phenomena are briefly reviewed. The three basic methods for inducing condensation around particulate material in a gas stream condensation through either transfer or removal of heat (thermal condensation), and condensation through conversion of internal energy to another form of energy (i.e., work or velocity) and equipment employing these methods, including steam injection in conjunction with a Peabody scrubber, use of cooling coils, and an experimental apparatus to achieve conversion condensation by adiabatic expansion, are discussed. Future improvements in dust removal equipment are expected to use the condensation technique in one form or another; however, where the dust particle is less than 1 micron, increasing its effective dimension is the most feasible way to obtain high-efficiency removal.

19630 APTIC NO. 38423

York, J. Louis

SPRAY TOWERS, BUBBLE TOWERS, AND PACKED TOWERS USING REACTIVE AND NON-REACTIVE LIQUIDS. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 302 - 309. 12 refs. (May 3-5, Louis C. McCabe, ed.)*

Spray, bubble, and packed towers are of prime value in removing undesirable vapors from gases because diffusion of vapor to the liquid surface is quite effective. The first step in absorption of pollutant vapors by these devices is qualitative and quantitative identification of the contaminant, frequently a sulfur compound, followed by selection of an absorbent. A simple solvent that dissolves the vapor and later releases it with no chemical step is a non-reactive liquid, often water or a heavy hydrocarbon oil. A reactive liquid, either one that releases the vapor reversibly by application of heat or steam or one that is discarded after irreversible conversion removes the vapor from the gas phase through a chemical reaction, transforming in into a less offensive form. Absorbents for sulfur vapors are discussed. Finally, a disposal method for the contaminant must be included before final selection is made, depending on whether the material is to be re-sold or dumped. Process and equipment design are discussed at length. Entrainment separators must be installed after most absorbers to prevent carry-over of the absorbent and creation of a new air pollution problem.

19631 APTIC NO. 38634

Youngquist, Gordon R. and Surendra K. Garg

SORPTION OF SULFUR DIOXIDE BY MICRORETICULAR ION EXCHANGE RESINS. *Ind. Eng. Chem., Process Design Develop., 11(2):259-261, April 1972. 7 refs.*

Rates and equilibria for sorption of sulfur dioxide by Amberlite IRA-45 ion exchange resin were determined experimentally. Rohm and Haas Amberlite IRA-45 is a weakly basic styrene-divinyl benzene copolymer of the microreticular type. The IRA-45 has very low surface area and negligible porosity in the usual sense since pores in microreticular resins consist only of spaces between polymer chains. Rate and equilibrium measurements were made gravimetrically using a Cahn RG automatic recording electro balance system. Sorption rates were diffusion-limited and much lower than those obtained previously using Rohm and Haas Amberlyst A-21, a macroreticular type resin with a high surface area and high porosity. (Author abstract modified)

19632 APTIC NO. 38188

Zhulin, N. V. and A. A. Komlev

USE OF FLOCCULANTS FOR PRECIPITATING PARTICLES IN GAS PURIFICATION SOLUTIONS. *(Primeneniye flokulyantov dlya osazdeniya chastuts v rastvorakh gazoochistki). Text in Russian. Tsvetny. Metal., 8(44):36-37, 1971. 3 refs.*

The effect of flocculants on the settling of suspended solids from sodium bicarbonate scrubber solutions used after the electrostatic precipitation of noxious gases from aluminum cells was examined. The solution contained approximately 25 g/l sodium fluoride, 53 g/l sodium carbonate and sodium bicarbonate, 47 g/l sodium sulfate, and 30 g/l suspended solids consisting of about 80% cryolite, aluminum fluoride, magnesium fluoride, and calcium fluoride and about 15% of calcination loss products, i.e., unburned coke and pitch. Decreasing the solution sodium sulfate concentration from 52 to 32 g/l and increasing the temperature from 20 to 50 deg increased the settling rate by 50 and 100%, respectively. Soap chips, sodium oleate, oleic acid, tall oil and its hydrolysis products, and hydrolyzed polyacrylamide accelerated the settling; of these, 30 mg/l of the hydrolyzed polyacrylamide was the best additive.

19633 APTIC NO. 37812

Ziegler, E.

BURNING PROCESS. KILNS, PREHEATERS, COOLERS, AND FIRING EQUIPMENT. *(Stand der Zement-Brennverfahren. Oefen, Vorwaermer, Kuehler, Feuerungen). Text in German. Zement-Kalk-Gips (Wiesbaden), 60(12):543-553, Dec. 1971. 29 refs. (Presented at the VDZ-Kongress, Verfahrenstechnik der Zementherstellung, Duesseldorf, West Germany, Sept. 28-Oct. 1, 1971.)*

At the present time almost half the clinker produced in Europe is burned in kilns equipped with a wide variety of suspension-type preheaters. Favorable heat consumption figures of 750 kcal per kg of clinker and a high degree of utilization of the waste heat are the characteristic features of modern rotary kiln plants with raw meal preheaters and grate-type preheaters. By means of mechanical water extraction it is possible to burn wet-processed raw materials in grate preheater kilns and thus reduce heat consumption. However, the cost of extracting the water must be added to the cost of burning. With large suspension preheaters the dust content of the exhaust air from the cooler is often so high that cleaning by means of cyclone or multicyclone collection no longer fulfills the requirements. Swirl-type fluidized bed filters or various types of cooler systems may solve this problem. Dry-process and wet-process kilns are compared.

19634 APTIC NO. 38190

Zimmermann, Lothar and Peter Fleischhauer

STABILIZATION OF THE SEPARATING CONDITIONS OF ELECTRIC SEPARATORS BEHIND CEMENT MILLS BY WATER SPRAY NOZZLE. *(Stabilisierung der Abscheideverhaeltnisse an Elektroabscheidern hinter Zementmuehlen durch Wassereinduesung). Text in German. Silikat. Tech., 22(12):407-409, Dec. 1971. 3 refs.*

The installation of electric separators at high-output cement mills is recommended as an economical approach to keeping dust emissions within the limits permitted by law. A prerequisite for stable and effective operation of filters is the installation of a water spray nozzle in the third chamber of the mill. The construction and operation of the nozzle and results obtained with such a nozzle are illustrated by an example. The results justify the recommendation.

19635 APTIC NO. 38439

Zizka, Jaroslav, Stanislav Servus, and Zdenek Cvrk

EQUIPMENT FOR REDUCING THE QUANTITY OF HARMFUL GASEOUS, LIQUID AND SOLID EXHALATIONS. *Czech. Heavy Ind. (Prague), no. 11:2-10, 1971.*

Performance data are given for several types of apparatus for removing harmful gases, liquids, and solids from industrial waste gases. Included are a foam-type separator for noncorrosive gases with a dust content up to 400 g/cu m; a current-type separator for highly dispersed liquid or solid aerosols; a separator for relatively coarse fibrous particles in a mixture with particles about 1 micron; and a two-stage Trition separator for solid or liquid aerosols with a particle size less than 1 micron. Also described are foam-type absorbers for soluble gaseous compounds such as hydrogen chloride and hydrogen fluoride or for aerosols of sulfuric acid, nitric acid, and sodium hydroxide; an overflow type absorber for more demanding absorption processes; a fibrous filter for oil mists; a separator and retainer of minute liquid aerosols; and a combustion device that totally oxidizes combustible substances in waste gases to carbon dioxide and water. The rated gas capacities of different models of each item are given together with the application possibilities of some of the equipment.

MEASUREMENT METHODS

19636 APTIC NO. 37806

SMOKE-DENSITY INDICATORS HELP TO COMBAT AIR POLLUTION. *Power, 115(9):99, Sept. 1971.*

A key advance in smoke density measurement combines continuous monitoring with instant indication and fast response to excessive emissions, thus holding air pollution violations to a minimum. A photoelectric detection system is described which consists principally of a lamp and receiving unit mounted on opposite sides of an exhaust stack. The sealed light source projects a parallel beam of energy through smoke traveling upward in the stack. The photocell receiver detects energy radiated from the light source and produces a minute electrical signal proportional to the energy detected. Since part of the radiant light energy is deflected or absorbed by suspended smoke particles, radiant energy detected by the photocell varies with the amount of suspended material. One manufacturer has an automatic system for periodically squirting a combination of air and water at high pressure through angled holes onto lens surfaces to prevent soot and dirt particles from settling there.

19637 APTIC NO. 37940

Ministry of Health and Welfare (Japan), Dept. of Environmental Pollution Control

SPECIFICATION FOR AIR POLLUTION MONITORING APPARATUS. *(Taikiosen kanshi setsubi shiyousho). Text in Japanese. 23p., April 1968.*

The specification has been presented concerning air pollution monitoring apparatus and their measuring methods. Telemeter equipment for monitoring of air pollution (analogue type), wireless sending and receiving apparatus for the telemeter, data processing apparatus, recording instruments for the automatic measurement of sulfur dioxide for the telemeter, recording instruments for the automatic measurement of dust, and recording instruments for the automatic measurement of the wind direction and velocity are discussed.

19638 APTIC NO. 37965

LASERS FOR MEASURING OF POLLUTION. *(Laser pour measurer la pollution). Text in French. Electron. Nouv., no. 4:16-17, May 1971.*

Diode lasers can be used to evaluate the concentration of gaseous air pollutants, either by means of sampling, or directly in the open air. The diode laser offers the advantage that it can be tuned within a wide band, thus permitting identification of the spectral characteristics of the principal pollutants and measuring of their concentration. The diodes are made of a tellurium-lead-tin alloy. For determination of carbon monoxide and nitric oxides, diodes of a material of a lead-selenium-sulfur compound have to be used, which will function in the desired manner if pumped by an electron beam. To make the results perceptible, several techniques are under consideration, including spectography, optical correlation, and direct measuring of the absorption coefficient of a laser beam. The principle of application is to study the variation of the transmissivity of a laser beam through a cell containing the sample to be tested, under varying voltage. Included in this new development is the testing of automobile exhaust gases, in which the diode current is modulated by superimposition of a minute signal of a few hundredths of one hertz. A method of permanent surveillance of large open spaces is under study, in which a diode laser of not more than one watt power will be sufficient for screening the atmosphere within a radius of 500 m. The diode is placed behind an optical assembly. It is expected that with this set-up concentrations down to 0.001 ppm of a gaseous pollutant will be discernible.

19639 APTIC NO. 38258

THE NETHERLANDS RECEIVE A COMPLEX AIR POLLUTION CONTROL SYSTEM. *(Niederlande erhalten umfassendes Luftverunreinigungs-- Kontrollsystem) Text in German. VDI (Ver. Deut. Ingr.) Nachr. (Berlin), 26(9):15, March 1972.*

The government of the Netherlands decided to install a measuring system for determining the concentration of sulfur dioxide, nitric oxide, nitrogen dioxide, oxygen, and carbon monoxide in the air; 250 monitors in the whole country perform the necessary measurements which are then transmitted to a regional measuring station and from there to the measuring center in Bilthoven where a computer evaluates the collected information. The model for the supervisory system was the air pollution control system at Rotterdam consisting of 31 SO_2 monitors continuously controlling air pollution. If the evaluated data exceed the given pollution tolerances, the activity of the Rotterdam industries which heavily contribute to the air pollution is reduced.

19640 APTIC NO. 38349

PORTABLE IMMEDIATE READOUT DUST MONITOR DEVELOPED. *Coal. Mining Process., 7(8):44-46, Aug. 1970. 1 ref.*

The need for on the spot determinations of airborne coal mine dust concentrations has resulted in a portable, battery-operated, immediate readout dust particle analyzer. Designed under the sponsorship of the Pennsylvania Coal Research Board by three scientists of the Center for Air Environment Studies at the Pennsylvania State University, the dust analyzer operates on the principle of light scattering from individual dust particles passing through a high intensity light field. It counts and discriminates by size airborne particles over two size ranges, 0.4 to 1.5 micron and upwards from 1.5 micron. A dilution mechanism permits analysis of particulate concentrations as high as 2400 particles/cu cm on each channel. Rechargeable nickel-cadmium batteries supply power for the pump used to draw air through the instrument and for the light source and electronic circuits. The total weight of the instrument including the brief case used as a carrier is approximately 14 lb. Operating details and field tests are described. Tests were conducted at quarries, limestone plants, and paving material plants.

19641 APTIC NO. 38670

Kanagawa Prefecture, Yokohama (Japan), Public Nuisance Prevention Center

ANALYSIS METHODS APPLIED TO POLLUTANTS. *(Kogai kankei no bunsekiho to kaisetsu). Text in Japanese. 122p., Feb. 1972.*

Various methods of analyzing heavy metals in the air, stack gases, water, and soil are reviewed. With regard to stack gas tests, atomic absorption spectrophotometry is explained for measuring cadmium, lead, and chromium. For measuring chlorine, the use of orthotolidine as a reagent is discussed. For analyses of fluorine, hydrogen fluoride, and other fluorides, lanthanum-alizarin complex ion method is discussed. For analyses of hydrogen and other cyanides, the pyridine-pyrazolone method and iron electrode method are discussed. The rosaniline test is explained for measuring sulfur dioxide and for detecting sulfur oxides in general the neutralization method, arsenazo III method, and chloranil acid barium test are discussed. The naphthylethylenediamine method is explained for the analyses of nitrogen oxides and nitrogen dioxide. For hydrogen sulfide, the methylene blue method, and for ammonia, the indophenol method and Nestler method are discussed. Gas chromatography is used for analysis of benzenes, toluenes, xylenes, trichloroethylene, phenols, mercaptans, monosulfides, disulfides, and aliphatic acid amines. For measuring formaldehydes, the chromotrope acid method and acetylacetone method are used. The tetra-aminoantipyrine method is also used for phenol measurement, and the p-aminodimethylanilyn method is used for mercaptans. For measuring aliphatic amines, picric acid may also be used.

19642 APTIC NO. 38294

Abell, Gurdon R. and Charles E. Gillespie

APPARATUS FOR REMOTE SENSING AND ANALYZING OF GASEOUS MATERIALS USING RAMAN RADIATION. *(Avco Corp., Cincinnati, Ohio) U. S. Pat. 3,625,613. 7p., Dec. 7, 1971. 4 refs. (Appl. June 28, 1958, 4 claims).*

Remote optical monitoring which provides many distinct advantages over point source measurement can be performed by observing the spectral distribution of laser light backscattered from pollutants, i.e., by observing the Raman scattering. The amount of a Raman shift expressed in wave numbers is characteristic of the molecular species of the illuminated gas and the particular molecular mode excited by the incident illumination. An apparatus is described which includes a laser transmitter, a receiver for gathering the scattered light, and a separating means for providing light beams at the wave number of the incident unshifted laser beam light and at the Raman shifted wave numbers of the light scattered by the remote gaseous materials being sensed and analyzed.

19643 APTIC NO. 37810

Aidam, Eckhard and Ralph Kanneberger

APPARATUS FOR THE ANALYSIS OF GASES FOR COMPONENTS WITH PARAMAGNETIC SUSCEPTIBILITY. *(Vorrichtung zur Analyse von Gasen auf Komponenten mit paramagnetischer Suszeptibilitaet). Text in German. (Siemens A. G. Munich (West Germany)) W. Ger. Pat. 1,926,510. 5p., Nov. 11, 1971. 9 refs. (Appl. May 23, 1969, 2 claims).*

Two inlet pipes carrying reference gas, another inlet pipe carrying the gas to be tested, and an outlet line carrying both reference and test gas are connected to a test chamber. The reference gas admitted through one of the two inlet pipes into the test chamber is led across a magnetic field. A flowmeter element is arranged in a crossed connection pipe between the two inlet pipes carrying reference gas. The flowmeter element is inserted in the symmetric line of the connection pipe and the two reference gas pipes. Nitrogen and paramagnetic gases can be applied as reference gases. In the latter case, the pressure obtained corresponds to the difference of the volume susceptibilities of the two gases. The inertia forces due to rotation are compensated for. Due to the specific arrangement, the effects of pressure pulses on the flowmeter element are eliminated. Laminary flow is maintained in the test chamber.

19644 APTIC NO. 38237

Axelrod, Herman D., Arthur F. Wartburg, Ronald J. Teck, and James P. Lodge, Jr.

NEW BUBBLER DESIGN FOR ATMOSPHERIC SAMPLING. *Anal. Chem., 43(13):1916-1917, Nov. 1971. 1 ref.*

An improved bubbler for gas sampling incorporates a Teflon top mated to a glass bottom with a ceramic porcelain frit. A silicone rubber O-ring in the top provides an airtight seal regardless o slight differences in bubbler neck sizes. The uniformity of the ceramic-frit pore size allows air to be dispersed through more holes than is possible in a glass frit, which should aid trapping efficiency. Since the entire system is leakdproof and all parts are interchangeable, the design offers excellent reliability and ease of operation in the field.

19645 APTIC NO. 38156

Badzioch, Stanislaw and Peter G. W. Hawksley

MONITORING DUST CONCENTRATION. *(Coal Industry (Patents) Ltd., London (England)) U. S. Pat. 3,605,485. 3p., Sept. 20, 1971. 5 refs. (Appl. May 8, 1970, 10 claims).*

A method of monitoring dust is presented which includes passing a stream of gas containing dust into a centrifugal flow separating device. While one characteristic of gas flow through the device is maintained constant and the dust concentration in the device is allowed to increase, another characteristic of gas flow through the device is monitored. For example, the characteristic monitored may be the difference between the pressure of the gas at the inlet of the device and the pressure of the gas at the outlet, the characteristic kept constant being the rate of flow through the device. (Author abstract modified)

19646 APTIC NO. 38426

Barnes, Lyle K.

SAMPLING SYSTEMS FOR GAS ANALYZERS. *Instrum. Technol., 19(1): 53-59, Jan. 1972. (Presented at the Instrument Society of America, Montreal, Quebec, March 1971.)*

A suitable sampling system is needed when a process requiring analysis is to be wed to an analyzer which cannot function at process conditions. A successful sampling system must perform three functions at justifiable cost: obtain a representative sample; prepare the sample for the analyzer while preserving compositional characteristics; and transport the sample fast enough that corrective action may be taken on the basis of analysis, The effects of temperature, pressure, flow conditions, condensable sample components, and dynamics of the overall system strongly influence the choice among available apparatus and approaches for sample taking and treatment. The dynamic response of the sampling system is of major importance. Samples must be analyzed in time for useful corrective action to be applied, and proper dynamics will insure both time and composition integrity of the sample.

19647 APTIC NO. 38646

Barynin, J. A. M. and M. J. G. Wilson

OUTDOOR EXPERIMENTS ON SMELL. *Atmos. Environ., 6(3):197-207, March 1972. 28 refs.*

A fast-response flame photometric apparatus was built for recording the concentration of sulfur compounds in air. This apparatus was used in making a breath-by breath record of the concentration, and of the human response to smell, at a point downwind from a continuous release of methyl thiol (methyl mercaptan). The concentration fluctuated rapidly, and human response followed it quite closely, though response could be quickly reduced by adaptation. Rapid rises in concentration were especially noticeable. Rapid fluctuations were found also in records of concentration made up to 5 km from an isolated power station, and in records made on a London roof. These fluctuations might lead to error in recording air pollutant concentration. (Author abstract modified)

19648 APTIC NO. 37974

Bernert, Juergen

EXPERIENCE IN THE DETERMINATION OF HYDROGEN SULFIDE IN WASTE GASES. *(Erfahrungen bei der Bestimmung von Schwefelwasserstoff in Abgasen). Text in German. Wasser Luft Betrieb, 15(7):259-260, July 1971. 18 refs.*

Adequate methods for the determination of hydrogen sulfide in waste gases are described. For hydrogen sulfide, an odor threshold of 0.1 ppm has been established. The permanent and 30-minute emission limits set by the German Engineers Association are 0.15 and 0.30 mg/cu m respectively. In the molybdenum blue technique (sorption process), the hydrogen sulfide bound as silver sulfide forms molybdenum blue with ammonium molybdate. In the methylene blue procedure (impinger technique), the hydrogen sulfide bound in the form of cadmium sulfide forms methylene blue with N,N-dimethyl-p-phenylene diammoniumchloride and iron(III)chloride. In the molybdenum blue technique using an impinger with a cadmium hydroxide suspension, the reaction of cadmium sulfide with hydrochloric acid is used. The above photometric methods are not suitable for emission concentration measurements. If only hydrogen sulfide is present, the absorption is best made in alkaline solution, followed by oxidation to sulfate and precipitation. A reaction of cadmium sulfide with copper sulfate and an electrolytic determination of copper give higher accuracy. In a reaction of cadmium sulfide with an iodine solution, the excess iodine is titrated by sodium thiosulfate. In the joint determination of H2S and sulfur dioxide, hydrogen sulfide is determined by one of the above methods in one sample, and the total of H2S and SO2 in another. Washing liquid should be used for sampling if elementary sulfur is present in addition to H2S and SO2.

19649 APTIC NO. 37777

Bourbon, P., J. Alary, J. Esclassan, and F. Alengrin

ANALYTICAL DETERMINATION OF NITROGEN OXIDES SUCH AS NO AND NO2. *(Contribution a la determination analytique des oxydes d azote NO et NO2). Text in French. Cent. Belge Etude Doc. Eaux, 24(337):526-534, Dec. 1971. 9 refs.*

Experiments were carried out to determine the efficiency of nitrogen dioxide absorption, the oxidation of nitric oxide to NO2, and the conversion factor. The investigation of the absorption by Griess-Saltzman type reagents revealed increased efficiency with increasing amine content. For high concentrations above 120 micrograms/100/ml, spectrophotometric analysis of diluted solutions was applied. The amount of the NO formed during the reaction of NO2 with the Saltzman reagent increased with increasing amine content. The transformation of NO into NO2 was studied on effluents from a heating system with sulfuric acid solutions of potassium permanganate, and high conversion factors were obtained. The amount of NO2 retained in the permanganate solution in the form of nitric oxide was determined by the NO3 NO2 reduction method, using cadmium. The retention rates obtained ranged from 10 to 60%. A retention of 10% and a conversion of 80% was obtained for dry oxidant filters, while the respective values for wet filters were 20% and 90-95%. Oxidation rates persistently above 90% were found for chromium anhydride, and a minimum rate of conversion of 95% was obtained with retention negligible. Humidity revealed a positive effect on the efficiency of the oxidation by chromium trioxide. Chromium anhydride was used for the simultaneou determination of NO and NO2, with NO concentrations in the order of 100 ppm, in exhaust gases. Saltzman factors were determined by means of Griess-Saltzman reagents containing 50 mg/l of amine. The arithmetic mean of the conversion coefficients for concentrations of 6-120 ppm below 5 ppm were 0.73 and 1, respectively.

19650 APTIC NO. 38438

Bryckova, E., V. Kleinbauer, R. Vlasak, and F. Konvalina

THE SYSTEM OF TELEMETRIC TRANSFER OF SO2 CONCENTRATIONS MEASURED IN AIR. *(System telemetrickeho prenosu merenych koncentraci klyslicniku siriciteho v ovzdusi). Text in Czech. Cesk. Hyg. (Prague), 16(6):198-200, 1971. 2 refs.*

A telemetric transfer system for measured ambient sulfur dioxide concentrations operates at distances up to 30 km and with a signal and a graphic record of the measured concentrations. Moreover, the apparatus signals and registers possible faults in the measuring system in the field.

19651 APTIC NO. 33238

Butcher, Samuel S. and Ronald E. Ruff

EFFECT OF INLET RESIDENCE TIME ON ANALYSIS OF ATMOSPHERIC NITROGEN OXIDES AND OZONE. *Anal. Chem., 43(13):1890-1892, Nov. 1971. 11 refs.*

Atmospheric concentrations of ozone, nitric oxide, and nitrogen dioxide are monitored by many control agencies using a variety of instruments. The reaction between ozone and nitric oxide is sufficiently rapid that a change of light intensity in the instrument inlet prior to chemical analysis can give rise to a systematic error. The magnitude of the error depends on the residence time in the inlet; significant errors can occur for a residence time of 10 sec. The expected effect of the gas-phase dark reaction was calculated for atmospheric data on the three species using a 10-second residence time. Large relative errors for a given substance occurred when concentrations were low, i.e., near the detection limit of many wet chemical instruments now in use.

19652 APTIC NO. 38053

Chand, Ramesh and Manuel Shaw

APPARATUS FOR MEASURING NITROGEN OXIDE CONCENTRATIONS. *(Dynasciences Corp., Los Angeles, Calif.) U. S. Pat. 3,622,487. 5p., Nov. 23, 1971. 13 refs. (Appl. Sept. 9, 1968, 6 claims).*

Nitrogen oxide concentrations present in a gaseous mixture can be rapidly and continuously monitored by measuring the current passing between an inert metallic sensing electrode and a counter electrode. The electrodes are in contact with an aqueous electrolyte solution, and the oxides are electro-oxidized at the sensing electrode. The sensing electrode is composed of an inert metal, whereas the counter electrode is composed of an electroactive material which is capable of being electrochemically reduced when interconnected with the sensing means in the presence of the aqueous electrolyte solution. This method is less costly and bulky than usual methods and does not require skilled technical personnel for its simple procedure. (Author abstract modified)

19653 APTIC NO. 38070

Chand, Ramesh and Manuel Shaw

APPARATUS FOR MEASURING SULFUR DIOXIDE CONCENTRATIONS. *(Dynasciences Corp., Los Angeles, Calif.) U. S. Pat. 3,622,488. 5p., Nov. 23, 1971. 11 refs. (Appl. Sept. 9, 1968, 8 claims).*

Although a number of sulfur dioxide analyzers are presently available, these instruments are generally costly and bulky, thereby inhibiting their widespread use and acceptance. In addition, many of these analyzers can only be operated by skilled technical personnel, often requiring a number of steps in effecting the analysis as well as critical calibration procedures and the handling of chemical solutions. Instrumental response is often slow. In the present method, sulfur dioxide concentrations can be rapidly and continuously monitored by measuring the current passing between an inert metallic sensing electrode and a counter electrode. The electrodes are in contact with an aqueous electrolyte solution, and sulfur dioxide is electro oxidized at the sensing electrode. The sensing electrode is composed of an inert metal whereas the counter electrode is composed of an electroactive material which is capable of being electrochemically reduced when interconnected with the sensing electrode in the presence of the aqueous electrolyte solution. (Author abstract modified)

19654 APTIC NO. 38594

Chatot, G., M. Castegnaro, J. L. Roche, R. Fontanges, and P. Obaton

COMPARATIVE STUDY OF ULTRASONIC AND SOXHLET EXTRACTION OF ATMOSPHERIC POLYCYCLIC HYDROCARBONS. *(Etude comparee des ultrasons et du soxhlet dans l extraction des hydrocarbures polycycliques atmospheriques). Text in French. Anal. Chim. Acta, 53(2):259-265, Feb. 1971. 14 refs.*

An ultrasonic method of extraction for atmospheric polycyclic hydrocarbons is described, and compared with the classical Soxhlet extraction procedure. The solvents compared were ethyl ether, chloroform, methanol, benzene, cyclohexane, and dichloromethane. Spectrophotometric determinations were made with piperonal, phosphorus pentachloride, and trifluoracetic acid. Benzo(a)pyrene standards of 6, 12, 18, 24 and 30 micrograms/ml of solvent were prepared. The extraction of 2 mg of dust in 60 ml of solvent required 8 hr for the Soxhlet procedure. The ultrasonic extraction of 20 mg of dust was made in 60 and 120 ml of solvent for 15, 30 and 60 min, respectively. The extraction was followed by centrifugation for 15 min. The optimum condition for the ultrasonic extraction was 30 min in 60 ml of solvent. The Soxhlet and ultrasonic extraction procedures were compared for seven different solvents with boiling points ranging from 34 to 81.4 C. For benzo(a)pyrene and aromatic compounds, the ultrasonic method using methanol as solvent proved to be best. Both methods were applicable for ether, dichlormethane, chloroform, and benzene. The ultrasonic method has the advantages of being rapid, requiring low temperatures (0-10 C), and causing no changes in the spectra.

19655 APTIC NO. 37869

Cleveland, Allen

SAMPLING PROCESS FOR COMBUSTION GASES. *(Olson Labs., Inc., Dearborn, Mich.) U. S. Pat. 3,611,812. 4p., Oct. 12, 1971. 4 refs. (Appl. May 13, 1970, 5 claims).*

A sampling process is presented which enables the oxides of nitrogen content of combustion engine exhaust gases to be accurately measured. The process comprises the introduction of a continuous stream of ambient air into a conduit system, reducing the temperature of the ambient air to not more than about 40 F, subsequently heating the air to about 130 F, and introducing exhaust gases into the system downstream from the heated air and mixing them with the heated air. The mixture of gases is passed through a heat sink to obtain a uniform temperature, and the gases are exhausted from the heat sink at a constant volume. A quantity of gas is drawn off into a sample tube. This process provides a sample of constant mass in terms of temperature, volume, and moisture content. (Author abstract modified)

19656 APTIC NO. 37884

Cohen, Martin J.

DETECTING A TRACE SUBSTANCE IN A SAMPLE GAS COMPRISING REACTING THE SAMPLE WITH DIFFERENT SPECIES OF REACTANT IONS. *(Franklin GNO Corp., West Palm Beach, Fla.) U. S. Pat. 3,621,239. 5p., Nov. 16, 1971. 4 refs. (Appl. Jan. 28, 1969, 4 claims).*

A method of ion classification or plasma chromatography is described, which more particularly is concerned with the utilization of a predetermined reactant on the species is measurements performed upon trace gases which undergo ion-molecule reactions. By employing particular reagent gases and/or by filtering the reactant or primary ions, predictable reactions are produced between the reactant ions and expected trace substances in a gaseous sample. The secondary ions produced by such reactions are separated and detected in a drift cell by utilizing the difference in velocity or drift time of ions of different mass in an electric field. The secondary ions produced and detected depend upon the relative ionization potentials of the reagent gas molecules and the trace gas molecules. Reagent gases having different ionization potentials, which may bracket the ionization potential of the trace gas, may be employed in multiple ion-molecule reactions with the trace gas, and the results of the multiple reactions may be compared.

19657 APTIC NO. 38704

Colosi-Esca, Doina

CONTRIBUTIONS TO THE DETERMINATION OF MALATHIONE IN THE AIR. *(Contributii la determinarea din aer a malathionului). Text in Romanian. Igiena, Bucharest, 20(5):299-305, 1971. 5 refs.*

An analytical spectrocolorimetric method for the determination of malathione, simplified and adapted to the specific requirements of industrial toxicology, is reviewed. Laboratory and field experiments confirmed the applicability of the method to occupational measurements and a sensitivity exceeding by far the maximum allowable concentration of 15 mg/cu m.

19658 APTIC NO. 38691

Decker, John A., Jr.

GAS ANALYSIS WITH HADAMARD-TRANSFROM SPECTROMETRY. *ISA (Instr. Soc. Am.) Trans., 10(4):348-355, 1971. 20 refs. (Presented at the Instrument Society of America Analysis Instrumentation Symposium, 17th, Houston, Tex., April 19-21, 1971.)*

A spectrometric technique for the quantitative analysis of molecular gases is examined. Hadamard-transform spectrometry allows the simultaneous measurement of several absorption wavelengths, characteristic of several specific gases of interest, with a comparatively economical and reliable instrument which needs only a single detector/preamplifier/data-analysis- electronics chain. Instrument design, the basic analysis techniques, and some research results are considered. An automobile exhaust analysis system encompassing a radically simplified approach is described.

19659 APTIC NO. 37972

Deswaef, R. and M. Rinaldi

CONTRIBUTION TO DIESEL ENGINE-INDUCED AIR POLLUTION STUDIES. NITROGEN OXIDES. *(Contribution a l etude de la pollution atmospherique par les gaz d echappement des moteurs Diesel. les oxydes d azote). Text in French. Cent. Belge Etude Doc. Eaux, 24(337):561-567, Dec. 1971. 6 refs.*

A method was developed for the determination of nitrogen oxides in exhaust gases from Diesel engines, and the results obtained are described. In the modified Saltzman method applied, inert carrier gas was admitted to a series of bubblers the first, second, and fourth of which contained 10 ml of Saltzman solution each. The third bubbler contained potassium permanganate. The degree of the oxidation of nitric oxide to nitrogen dioxide was 95%, minimum. Thus, the Saltzman method was directly applicable for all concentration ranges of NO and NO2, and different factors influencing the sensibility or the reproducibility of the method could easily be studied. The NO-NO2 concentration variations were studied on a test stand by varying the speed of rotation or the output of the Diesel engine. The NO2 and NO concentrations in the exhaust channel were in ranges of 50-100 ppm and 500-1300 ppm, respectively. Decreased concentrations were observed with decreasing speed and output. The proportion of NO2 within NO+NO2 was + or 10%. The nitrogen dioxide formed amounted to 20-25% of the total amount of nitrogen oxides. The half-life period of NO in a concentration of 1 ppm was 69 hr. This value is dependent on the catalytic effects of exhaust constituents. The NO and NO2 concentrations as well as NO2/NOx ratios were determined for different bus traffic frequencies. Sharply decreased ratios were found for high frequencies. The NOx concentrations were strongly influenced by the different duties of the Diesel engine. The NO/NO2 ratio reached a value of 25% in a relatively short time.

19660 APTIC NO. 38705

Fine, David H.

CRITICAL EVALUATION OF SALTZMAN TECHNIQUE FOR NOX ANALYSIS IN THE 0-100 PPM RANGE. *Environ. Sci. Technol., 6(4):348-350, April 1972. 7 refs.*

The Saltzman technique for batch nitrogen oxide analysis from flames, of which 95% is nitric oxide, was critically evaluated using pure oxygen as the oxidizer. Optimum operating conditions were established as the dilution of the flame sample with pure oxygen to 50% partial pressure and a residence time in the absorbing flask of about 24 hr. The ASTM standard phenol disulfonic acid procedure for NOx analysis gave values which were too low when the oxygen content was greater than 20%. The reproducibility of the method was determined at better than + or 0.3%. (Author abstract modified)

19661 APTIC NO. 38315

Fodor, G. G. and G. Winneke

NUISANCE REACTIONS INDUCED BY ODOROUS COMPOUNDS. *(Belaestigung durch geruchsintensive Stoffe). Text in German. Zentralbl. Bakteriol. Parasitenk. Infektionskr. Hyg.: Abt. 1: Orig. Reihe B, 155(3):282-295, 1971. 19 refs.*

Organoleptic methods are at present the only practical means of evaluating odorous compounds in the atmosphere. These methods generally determine odor intensity in terms of odor units. The number of odor units of an odorous discharge is equal to the number of equal volumes of odor-free air necessary to dilute the odorous sample to the threshold concentration. The organoleptic methods are limited by the rapid adaptation of the olfactory sense, as well as by the wide inter-individual variability of olfactory sensitivity, covering three to four logarithmic steps. For this reason odor panels must be characterized in terms of their threshold distribution. Odor nuisance reactions are influenced by stimulus factors, (e.g., unpleasantness of odors, duration, intermittency, and time of odor exposure), as well as by personal and psycho-social factors. An interdisciplinary research project is being prepared to investigate the relationship between measurable odor parameters and nuisance reactions. To account for the more pronounced nuisance reactions to unpleasant odors in a standardized manner, the possibility of combining threshold values with unpleasantness indices should be considered when environmental exposure standards are established. A scale based on psychometric scaling methods would provide a standard frame of reference for any environmental odor, characterizing quantitatively its degree of unpleasantness.

19662 APTIC NO. 38057

Fusco, Serafino J.

METHOD AND APPARATUS FOR DETECTING GASES OR VAPORS. *(General Electric Co.) U. S. Pat. 3,607,085. 4p., Sept. 21, 1971. 3 refs. (Appl. Aug. 29, 1969, 9 claims).*

A method and apparatus are presented for detecting extremely minute quantities of gases and vapors, particularly those chemical compounds having an active phosphoryl or phosphate groupings, such as certain insecticides. A condensation nuclei technique of measurement is employed, having a converter that forms a nucleus from a gas phase reaction between the gaseous material being detected and a volatile reagent in the presence of water. The nuclei forming reaction is augmented by providing a corona discharge in the converter. The reacting materials can be introduced separately or in combination to the converter. (Author abstract modified)

19663 APTIC NO. 38562

Galazka, Jerzy and Ewa Hajewska

DETERMINATION OF BERYLLIUM IN DUSTS. *(Oznaczanie berylu w pylach). Text in Polish. Chem. Anal. (Warsaw), 16(3):685-687, 1971. 5 refs.*

Wet filter paper containing dust was dissolved in 1.1 sulfuric acid until white fumes appeared and then was distilled with concentrated sulfuric acid to a beryllium concentration of 0.037-0.65 ppm. A spectrogram of this solution was obtained using graphite electrodes with a 3-A spark; the analytical line observed was 3130.4 A. The relative standard deviation was approximately 20%.

19664 APTIC NO. 38547

Gerber, Hermann E.

ON THE PERFORMANCE OF THE GOETZ AEROSOL SPECTROMETER. *Atmos. Environ., 5(12):1009-1031, Dec. 1971. 16 refs.*

The Goetz aerosol spectrometer was evaluated with respect to capability to resolve size distributions of polydisperse aerosols and examined for design, operational efficiency, and calibration. The performance of the instrument is dependent on its operating modes and is independent of different instruments. The commercially available instrument overestimates the contribution of large particles in the measured size distributions. Previous arguments were invalid, since the complicated velocity distributions in the instrument channels were disregarded. After a simple modification to the geometry of the entrance to the instrument s deposition channels, the spectrometer was capable of accurately determining particle sizes within 0.03-3.0 micron. (Author abstract modified)

19665 APTIC NO. 37913

Gray, Donald, David M. McKown, Michael Kay, Matt Eichor, and James R. Vogt

DETERMINATION OF THE TRACE ELEMENT LEVELS IN ATMOSPHERIC POLLUTANTS BY INSTRUMENTAL NEUTRON ACTIVATION ANALYSIS. *IEEE Trans. Nucl. Sci., 19(1):194-196, Feb. 1972. 3 refs.*

Sample collection and activation analysis techniques for the determination of trace elements in air-borne particulate matter are examined. The particulate samples were collected on filters and in a particle impactor. Sample handling and standard preparation are described. The samples were irradiated and counted after specified decay time periods. The optimum irradiation and decay scheme for the particulates are tabulated. The trace elements detected in the samples included titanium, aluminum, vanadium, calcium, magnesium, chlorine, manganese, sodium, bromine, arsenic, potassium, cerium, mercury, chromium, antimony, iron, zinc, cobalt, and selenium.

19666 APTIC NO. 38208

Grojean, Richard E. and John F. Rendina

QUANTITATIVE GAS PHASE ANALYSIS BY MEANS OF ELECTRON IMPACT SPECTROMETRY. *Anal. Chem., 43(2):162-171, Feb. 1971. 9 refs.*

Performance of an electron impact spectrometer specifically designed for quantitative gas phase analysis is examined. The region of linear response with concentration is defined, and a calibration technique applicable to the linear response region and nonlinear response region are outlined and illustrated. The accuracy of the method, for determination of concentration, is shown to be within the limits of experimental error. A comparison is made with the related technique of optical absorption spectrometry to illustrate some advantages of the electron impact method. (Author abstract)

19667 APTIC NO. 38043

Guicherit, R.

OZONE ANALYSIS BY CHEMILUMINESCENCE MEASUREMENT. *Z. Anal. Chem., 256(3):177-182, 1971. 5 refs.*

Ozone concentrations in ambient air can be determined by measuring light emitted by reaction with the chemiluminescent dye Rhodamine B. The stability of the light emission is increased by protecting the dye with a compound that reacts with ozone more easily, i.e., gallic acid. The stability of the chemiluminescent surface is also increased by an intermittent sampling procedure. This is accomplished by means of a three-way valve allowing the introduction of ozonized air for about 15 sec/min in the reaction chamber, followed by introduction of ozone-free air for about 45 sec. A check of the stability of the zero-point of the detecting system is thus obtained. The method is highly selective. No interferences of nitrogen dioxide, chlorine, sulfur dioxide, ammonia, hydrogen chloride, hydrogen peroxide, or hydrogen fluoride were observed at concentrations up to 2 ppm. The sensitivity of the chemiluminescent surface is decreased by adsorbed moisture. The moisture problem can be eliminated by coating the surface with a hydrophobic compound and by controlling the relative humidity of the ozone-free air between the actual ozone measurements. (Author abstract modified)

19668 APTIC NO. 37967

Harman, John Nepomucene, III and Radhakrishna Murty Neti

METHOD AND DEVICE FOR THE DETERMINATION OF NITROGEN OXIDE IN A GAS STREAM SAMPLE. *(Verfahren und Vorrichtung in einem Gasprobenstrom). Text in German. (Beckman Instruments Inc., Fullerton, Calif.) W. Ger. Pat. 2,061,779. 23p., July 15, 1971. (Appl. Dec. 15, 1970, 18 claims).*

The method and device described are designed to determine both the nitrogen oxide and nitric oxide content in the atmosphere or in other gaseous media. The gas sample is mixed with ozone to effect the oxidation of NO to nitrogen dioxide in a reactor, whereupon the remaining unreacted ozone and other interfering components (sulfur dioxide, hydrogen sulfide, halogens, mercaptans) are removed by scrubbing with a silver oxide solution, and if necessary in a second scrubber containing lime water or potassium hydroxide. The ozone required is produced by photooxidation by passing air through a layer of activated carbon and exposing it to ultraviolet radiation or by electrical discharge in air. The nitrogen dioxide in the gas is unaffected by the scrubbing and is determined in a colorimetric analyzer used in the Saltzman method which consists of an absorbent and a spectrophotometer. A coulometric galvanic cell can likewise be used as a NO2 analyzer. The electrolyte of the cell is a solution of a halide, the cathode is of platinum or of graphite; the anode is of activated carbon, calomel or silver chloride. The NO2 dissolves in the electrolyte where it oxidizes the iodine ions to iodine which on the cathode is again reduced to iodine ions generating a galvanic current whose intensity is a function of the quantity of NO2 introduced into the cell.

19669 APTIC NO. 38434

Hemeon, Wesley C. L.

DUSTFALL SAMPLING APPARATUS. *(Assignee not given.) U. S. Pat. 3,572,128. 4p., March 23, 1971. 5 refs. (Appl. June 13, 1969, 8 claims).*

A dust fall sampling apparatus is presented which is automatic, simple in construction and operation, and which permits the collection of numerous short-term samples in sequence within a given time period and storage of them for subsequent evaluation. It can be operated by a battery. A series of wipers are disposed above a smooth horizontal surface that collects falling dust. Periodically, wiping movement is effected between the collecting surface and each wiper in succession so that the dust is removed from the surface and retained on the wiper engaging it. This wiper is then moved to a storage position and the next wiper is moved into contact with the collecting surface. Means are provided for removing the dust from each successive wiper in the storage position and for measuring the quantity of dust so removed. (Author abstract modified)

19670 APTIC NO. 38588

Hermann, Guenter

HUMIDITY INDEPENDENT AIR SAMPLER FOR THE DETERMINATION OF SO2 EMISSIONS. *(Ein netzunabhaengiges Probenahmegeraet zur Bestimmung von SO2-Immissionen (SO2-Messkoffer 3a). Text in German. In: Technik und Umweltschutz Luft-Wasser-Boden-Laerm. Kammer der Technik, Brennstofftechnische Gesellschaft in der Deutschen Demokratischen Republik (ed.), Leipzig, VEB Deutscher Verlag fuer Grundstoffindustrie, 1972, p. 90-105. 7 refs.*

General problems of sampling layout and an air sampler for sulfur dioxide determination are described. For the determination of the space structure of emissions, short-term measurements with temporary measuring networks are most economical. A handy air sampler has been developed for such measurements on the basis of the pararosaniline method (TCM method), which requires minimum time for both preparation and measurement. It includes a gas-tight storage battery of 6 Ahs, a low-voltage diaphragm pump, a flowmeter, an automatic sampling time limiter, and 30 micro-washing bottles. The sampling time, normally 10 min, can be adjusted depending on the actual concentrations. About 200 10-minute samplings can be made during a charging cycle at a flow rate of 60 1/hr. The device, with dimensions of 40 by 16 by 25 cm, has a gross weight of 6 kg. The sampler is suitable for outdoor measurements conducted by public health service, forestry administration, and works inspection departments.

19671 APTIC NO. 37778

Imai, S., A. Hamaguchi, K. Ito, and T. Miyata

FOR ROUTINE WORK, EMISSION SPECTROPHOTOMETRIC DETERMINATION OF TRACE ELEMENTS IN SUSPENDED PARTICULATE. *(Ruchinwaku o mokuteki to shita fuyu biryushi-chu no biryo genso no hakko bunseki). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):84, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)*

In order to obtain a better method of determining trace elements in air-borne dust than conventional methods which use a combination of high-volume air samplers and glass fiber filters, a collection method using a low-volume air sampler with a cellulose-ester type filter called Millipore filter was examined. The sample is collected at 20 l/min for 10 days by the filter. Powders of indium oxinate (as a matrix element) and palladium (as an internal standard) are added to the filter, which is then subjected to low temperature ashing. Graphite and lithium carbonate are added to the ash, which is filled into a boiler cap electrode to be analyzed for trace elements by emission spectrophotometry. In this method, extraction by acid is not necessary and the concentration of trace elements in a sample is higher.

19672 APTIC NO. 38682

Imai, Sakingo and Kiyoshi Ito

EMISSION SPECTROPHOTOMETRIC DETERMINATION OF TRACE ELEMENTS IN AIR POLLUTANTS. *(Hakko bunko bunseki-ho ni yoru taikichu biryo genso no teiryo). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(3):322-328, Dec. 1971. 11 refs.*

Emission spectrophotometry was used for the analysis of tin, vanadium, titanium, molybdenum, copper, manganese, lead, zinc, and iron in air pollutants. The trace elements were leached out twice with 50 ml 6 M hot hydrochloric acid from the glass fiber filter on which the particulates were collected. The sample solution was then filtered and diluted to approximately a 150-ml volume with twice-distilled water. A 10-milligram quantity of indium as carrier and 10 micrograms of palladium as internal standard were then added, along with 10 ml of 10% oxine-acetic acid solution, 4 ml of 1% thionalide-glacial acetic acid solution, and 4 ml of 10% tannic acid aqueous solution. The pH of the resulting solution was adjusted to 5.2 with ammonium hydroxide or acetic acid, and the solution was allowed to stand overnight to ensure complete precipitation. The precipitate was then filtered, ashed at 450 C for about 10 hr, added to a high purity graphite powder of half-fold versus ashweight, and mixed. The mixture was loaded into a carbon electrode and arced for 2 min.

19673 APTIC NO. 37934

Ipatova, S. A.

DETERMINATION OF ACROLEIN IN THE AIR USING ITS AIR REACTION WITH 4-HEXYLRESORCINOL. *(K voprosu opredeleniya akroleina v vozdukhe po reaktsii s 4-geksilrezortsinom). Text in Russian. Gigiena i Sanit., 36(10):64-66, Jan. 1972. 1 ref.*

The possibility of the replacement of the reagents required for Altshuller s method (4-hexylresorcinol, mercuric chloride, and dichloroacetic acid) by other reagents was studied. The reagents investigated were mercuric acetate in an alcohol solution, and silver nitrate in an aqueous alcohol solution. Three series of standards with an acrolein content from 0.2 to 100 micrograms were analyzed with the three different reagents, and the two latter were applicable. Mercuric acetate is required in the same amount as 4-hexylresorcinol, and silver nitrate makes the heating of the samples unnecessary. The sensitivity of the determination was dependent on the catalyst. The maximum absorption was consequently at 605 nanom. Acrolein storage tests were carried out with different absorber solutions. Analyses after 24 hrs storage at O C showed acrolein losses of 22-25% and 30-40% in ethylene and isopropylene, respectively. Thus, ethylene should be used for sampling if analysis is not made immediately.

19674 APTIC NO. 37958

Itakura, Jun, Takatoshi Tajima, and Shigeru Ushijama

RADIOACTIVATION ANALYSIS OF MN AND V CONTAMINATED IN SOOT AND DUST FALL. *(Kokabaijin chu no mangan oyobi vanajiumu no hoshaka bunseki). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):444, 1971.*

By application of radioactivation analysis for determining manganese and vanadium contained in soot and dust fall, analysis of metallic components without chemical separation process by gamma-ray spectrometry using a Ge(LI) detector was tried. Specimens collected at two points in Kanazawa city during a certain period were calcinated; 50 mg was enclosed in a polyethylene tube. Falling dust and soot with a 20 micrograms each addition of Mn and V were used for comparison; the standard specimen was prepared in four stages in 5 to 40 g, soaked to 3 papers, and after drying, enclosed in a polyethylene tube. The specimens were exposed in a vertical test hole of an atomic pile (thermal neutron: 1.6 times 10 to the 12th power n/sq cm/sec) for five minutes. For radioactive nuclides of Mn and V due to thermal neutron, 56Mn and 52V from (n, r) reaction were used. After cooling M56 for 90 min and 52V for about 10 min, gamma-ray spectrum was estimated with a wave height analyzer using a Ge(Li) detector, keeping them in the polyethylene tube. According to the result, the value for Mn obtained from analysis by atomic absorption spectrometry coincided. By this method, synchronized nondestructive assay of several kinds of micro-metallic components is possible.

19675 APTIC NO. 38603

Jaeger, Jiri

DETERMINATION OF BENZANTHRONE IN THE ATMOSPHERE BY FLUORESCENCE SPECTROGRAPHY. *(Stanoveni benzanthronu v ovzdusi pomoci fluorescencni spektrografie). Text in Czech. Chem. Listy, 65(8):868-871, 1971. 8 refs.*

The determination of benzanthrone by fluorescence spectrography is based on the measurement of the intensity of the fluorescence maximum (at 465 nm) at the boiling point of nitrogen of a benzanthrone solution in ethylalcohol following its separation from a sample by thin layer chromatography. Benzanthrone is present in solid suspended atmospheric particles at concentrations of the same order as 3,4-benzopyrene. Its high photodynamic activity can be used as an index of its carcinogeneity (subcutaneous application to mice causes pulmonary tumors and tumors of the thyroid gland and the maxilla). Sampling is accomplished by aspiration on a glass fiber filter from which organic substances are extracted by methylene chloride in a Soxhlet for seven hours. From the extract a chromatogram is obtained on alumina and silica gel by development with toluene-ether mix; a number of subsequent steps yield a benzanthrone spot which, when dissolved in five ml ethanol is used for the final fluorimetric determination. The losses of the method are 18% for a 18 microgram concentration of 0.1 microgram benzanthrone in one ml final solution with an accuracy of + or 0.02 micrograms.

19676 APTIC NO. 37799

Kasparov, A. A. and V. G. Kiriy

ON THE METHODS OF DETERMINING BORON FLUORIDE IN THE AIR. *(K. voprosu o metodakh opredeleniya ftoristogo bora v vozdukhe). Text in Russian. Gigiena i Sanit., 37(1):57-59, 1972. 4 refs.*

An improved method for the determination of boron fluoride in low concentrations in the air, applied in sanitary paxis, is described. The method is based on the hydrolysis of BF3. The determination is made on the basis of boron ions following the distillation of the fluorine, by means of 1,1-diantrimide indicator. The necessary reagents are 98% sulfuric acid, an indicator solution with sulfuric acid, while the standard solution of boric acid contains boron in a concentration of 1 mg/ml. The sampling is made by two absorbers containing distilled water. The flow rate applied is 60 l/hr at a sample volume of 30-60 l. The fluorine distillation is made by means of sulfuric acid of 98% in oil bath of 140-150 C. About half of the liquid should be evaporated, while the fluorine forms volatile fluosilicic acid with silicon in the presence of sulfuric acid as a catalyst. The boric acid losses are unimportant. The analysis is made by means of 98% sulfuric acid and indicator. After heating in boiling water bath and cooling down, the determination is made by comparison with a standard or by the colorimetric method, using red filter. The calibration curve is plotted from standard solutions with different concentrations. The test with distilled water showed good accordance of the results. The sensitivity is 0.2-0.3 micrograms of boron or 1.5-2.0 micrograms of BF3, with a maximum error of 5-10%.

19677 APTIC NO. 37971

Kastien, Heinz

THE CHROMATOGRAPHIC DETERMINATION OF LEAD IN AIR DUSTS. *(Die chromatographische Bestimmung von Blei in Luftstaeuben). Text in German. Helv. Chim. Acta, 53(264):2231-2233, Dec. 1970. 2 refs.*

A thin-layer chromatographic method for the determination of lead in air dust samples, is described. The chromatograms were prepared on foils with silica gel and cellulose powder. After drying on air, the first chromatogram was besprinkled with a 0.2% aqueous solution of potassium rhodizonate; the appearance of blue spots indicated the presence of lead. The other chromatogram was sprayed with a 1%-solution of sodium sulfide. A calibration curve was plotted from four strips of lead acetate solutions containing 0.1; 0.05; 0.033 and 0.25% of Pb. Four peaks were obtained. The lead content in a dust sample separated from air by means of electrostatic filter was determined by dissolving 10 g of dust in concentrated hydrochloric acid of 50 ml. The result obtained was 0.435%. The error was 5 mg/100 ml of Pb-containing solution, and the deviation for two determinations of the same unknown Pb-solution was found to be + or - 1.15%.

19678 APTIC NO. 38320

Kimura, Norio and Zenya Hasegawa

MEASUREMENT OF THE PARTICLE SIZE DISTRIBUTION OF AIR-BORNE DUSTS BY A MICRO-CYCLONE METHOD. *(Cho kogata saikuronho ni yoru funjin no ryudo bunpu sokutei). Text in Japanese Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):88, 1971. 3 refs. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)*

Determination of size distribution of air-borne dust by means of miniature cyclones was carried out in order to seek a simpler method than the one using a cascade impactor. Approximating that the collection efficiency of a cyclone at some flow velocity corresponds to the accumulated percentage of dust sizes, size distribution of dust can be determined by measuring the collection efficiency of cyclones combined in parallel which can separate dust into ones with different diameters (called separation limit diameter). An example of determination of separation limit diameter is shown by using DBP-aerosol, the size distribution of which is separately determined by means of a light dispersion precipitator, and cyclones of barrel diameters of 20 mm (outlet pipe diameter, 4 to 10 mm) and 10 mm (outlet pipe diameters, 1.8 to 5 mm). In addition, the obtained separation limit diameter was compared with the theoretical diameter by Barth; they were in fairly good agreement.

19679 APTIC NO. 38458

Kitase, Masaru, Eiichi Ito, and Kiyoshi Kubo

EXAMINATION OF ESTIMATED VALUE OF CARBON DISULFIDE IN AIR BY SAMPLING METHOD. *(Kichu niryukatanso no sanpuringu hoho ni yoru sokuteichi no kento). Text in Japanese. Nagoya-shi Eisei Kenkyushoho (Ann. Rept. Nagoya City Health Res. Inst.), no. 17:95-98, 1970. 2 refs.*

Using a diethylamine copper acetate solution (absorbent A) and a hydrochloric diethylamine copper solution (absorbent B), the estimation of carbon disulfide contained in air was carried out. The follow-up examination for the difference in absorption caused by different concentrations and the change in absorption rate which depends upon the absorbing speed was carried out. The quantitative determination was made, after making a test solution, coloring the standard series of solutions, and keeping them at room temperature, by estimating spectro-absorption with estimating wave of 430 millimicron for 20 min. Both absorbents A and B revealed more or less increase of an absorption when they were left untouched for checking their stability. After several hours, in absorbent B there was no change and the stability was evident, but absorbent A lacked more or less stability. All reaction substances due to both the solutions showed maximum absorbtion at 435 millimicron. Absorption of carbon disulfide in air collected with commonly used small type absorbing tube was not good, and for the estimation of highly concentrated pollution, 50 100 ml/min of sample air were enough to make a satisfactory estimation, but for the estimation of low concentrations less than 0.1 ppm, sample air of more than 10 l is necessary. In an absorbing speed of 200 ml/min, when one absorbing tube was used, the absorption was 74.6% by solution and 55.3% on the average by solution. As for the stability of absorbent, ansorbent B is better, but in the case of actual estimation, the necessity of considering the special characteristics of both absorbents was noted.

19680 APTIC NO. 38350

Kobayashi, Akihiro, Hiroshi Tagashira, and Naoki Takahashi

IONIZATION CHAMBER SMOKE DETECTOR. *(Ionisationshammer- Rauchfuehler). Text in German. (Nittan Co., Ltd., Tokyo (Japan)) W. Ger. Pat. Appl. 2,035,671. 4p., July 17, 1970. 2 refs. (2 claims).*

The design for a smoke detector is presented. The instrument consists of one open and one closed ionization chamber, each with a pair of electrodes, and an internal radioactive source. One of the electrodes of the open chamber has a protrusion extending toward the other electrode; the impedance changes in the open chamber are detected by a field effect transistor. The length and/or effective diameter of the protrusion can be adjusted or moved toward the other electrode. The adjustable sensitivity range is much larger than for similar smoke detectors, without the disadvantage of sophisticated and complex gadgets.

19681 APTIC NO. 38429

Kobayasi, Takao and Humio Inaba

SPECTROSCOPIC DETECTION OF SO2 AND CO2 MOLECULES IN POLLUTED ATMOSPHERE BY LASER-RAMAN RADAR TECHNIQUE. *Appl. Phys. Letters, 17(4):139-141, Aug. 15, 1970. 12 refs.*

Raman backscatter from sulfur dioxide and carbon dioxide molecules in polluted atmospheres was detected using a Q-switched ruby laser beam. The spectral analysis of these Raman components was performed to compare spectral profiles obtained in polluted atmospheres with those in ordinary atmospheres and to determine the relative concentrations of the molecules. The measured spectra, which confirm the location of the SO2 Raman signal, are shown. Calculated molecular densities were 6.0 times 10 to the 18th power for CO2 in a polluted atmosphere and 3.0 times 10 to the 17th power for SO2 in a polluted atmosphere.

19682 APTIC NO. 38546

Kramer, David N. and John M. Sech

NEW SENSITIVE METHOD FOR QUANTITATIVE ASSAY OF AMMONIA IN AIR. *Anal. Chem., 44(2):395-398, Feb. 1972. 12 refs.*

A direct one-step method for the determination of ammonia (and aliphatic amines) is presented. The method requires collection of ammonia in a suitable neutral solvent containing a new reagent, o-(benzenesulfonamido)-p-benzoquinone, I, and measuring the absorption of light at 480 nm. Experimental apparatus consisted of spectrophotometers in the ultraviolet and visible regions and spectrometers in the infrared spectra. Operating techniques and results are discussed.

19683 APTIC NO. 37813

Kuzmicheva, M. N.

SEPARATE DETERMINATION OF CHROMIUM AND NICKEL IN THE AIR BY MEANS OF PAPER CHROMATOGRAPHY. *(K razdelnomu opredeleniyu khroma i nikelya v vozdukhe s pomoshchyu bumazhnoy khromatografii). Text in Russian. Gigiena i Sanit., 36(11):70-71, Nov. 1971. 2 refs.*

A paper-chromatographic method for the separate determination of chromium and nickel in the presence of iron, in air, is described. The major problems are proper choice of carrier solutions, reagent and chromatographic paper as well as the chromatographic separation. The most suitable carrier system contains ethylalcohol, isopropyl alcohol, benzene and hydrochloric acid in ratios of 1.5:4.5:1:3. Dimethylglyoxyme dissolved in hydrochloric acid proved to be an excellent complexing agent. The chromatographic separation was made in airtight glass chambers for 24 hours. Very stable coloration was obtained by spraying of the chromatograms with a solution of orto-oxyquinoline, followed by an exposure to ammonia atmosphere. The quantitative determination of chromium and nickel in the presence of iron was made by means of chromatographic standards containing 0.5, 1, 2, 4, 6 and 8 micrograms of chromium and nickel. The minimum detectable quantity of chromium and nickel is 0.5 micrograms each. The extraction from the sample is made by means of the Ackermann-Schlosser method.

19684 APTIC NO. 38189

Laer, R. Van

AUTOMOTIVE VEHICLE TESTING IN ACCORDANCE WITH AIR POLLUTION REGULATIONS ISSUED BY THE COUNCIL OF THE EUROPEAN COMMUNITY. *(Beschrijving van de proeven op automobielvoertuigen voorgeschreven door Raad van de Europese Gemeenschap tot bestrijding van de luchtverontreiniging). Text in Dutch. Ingenieursblad, 40(15/16): 439-442, Aug. 1971.*

The procedure for testing vehicles in accordance with the regulations issued by the Council of the European Community is reviewed. The basic elements of the test consist of a dynamometric roller test stand for automobiles; test apparatus to measure concentrations of carbon monoxide, carbon dioxide, hexane, and oxygen; and receiver bags for sampling the exhaust gas. The test stand is equipped with a system for the simulation of curves and for connecting the driving shafts directly with the dynamometric brakes. Concentrations of CO, CO2, and hexane are analyzed on the principle of irradiation absorption.

19685 APTIC NO. 38090

Lahmann, Erdwin and Karl-Ernst Prescher

AUTOMATIC DETERMINATION OF SULFUR DIOXIDE BY A POLAROGRAPHIC- COULOMETRIC APPARATUS. *(Automatische Schwefeldioxide- Bestimmungen mit einem polarographisch-coulometrisch arbeitenden Geraet). Text in German. Wasser Luft Betrieb, 15(10):366-367, Oct./Dec. 1971. 7 refs.*

The method of J. V. A. Novak was applied to the continuous measurement of sulfur dioxide in air. Sulfur dioxide in the sample gas is oxidized by iodine in a sulfuric acid solution, and the I(-) ion so formed is oxidized to I at 0.2 V on a carbon electrode. Oxygen, chlorine, ammonia, nitrogen oxides, and carbon monoxide do not interfere, but H2S does. The method gives 10% higher values, on the average, than the Picoflux method.

19686 APTIC NO. 37767

Lichtenstein, Stanley

INVESTIGATING AND MEASURING THE MAJOR AIR POLLUTANTS. *Ind. Heating, 39(1):24, 26-28, 158, Jan. 1972.*

To help out in the Environmental Protection Agency s planned crackdown on the most unwanted air pollutants, new devices and analytical techniques are being developed under the Measures for Air Quality Program undertaken by the National Bureau of Standards. A simple-looking gadget about the size and shape of a pencil is a sulfur dioxide permeation tube, indicating very precisely the rate at which the tube s liquid SO2, changing to a gas, seeps through the tube s walls at controlled temperatures. Standard reference materials are very important in any pollutant measurement program because they offer a unique guarantee of accurate and compatible measurements regardless of the method used. The National Bureau of Standards is preparing to measure the complete chemical composition of a typical sample of big-city particulates. Particle density and size distributions in auto exhausts and the atmosphere at large may be measured by light-scattering techniques. Instruments are being developed for the measurement of nitrogen oxides, formaldehyde, reactive hydrocarbons, and carbon monoxide. Air sampling and the scope of the Measures for Air Quality Program are considered.

19687 APTIC NO. 37888

List, Hans and Erich Schreiber

WASTE GAS SAMPLER. *(Assignee not given.) U. S. Pat. 3,610,047. 3p., Oct. 5, 1971. 5 refs. (Appl. March 18, 1970, 3 claims).*

In conventional waste gas sampling devices, the whole of the waste gases produced by the internal combustion engine are usually collected in plastic bags over a reasonable period of time. This method is particularly disadvantageous because of the large space required for the accommodation of the plastic bags, which renders both the handling and evaluation of the samples most difficult. A device is described for the removal of waste gas samples from the exhaust pipe of internal combustion engines, which comprises a chamber connected to the exhaust pipe together with a pump and a motor connected to it. The sampling pipe has one end connected with the chamber and the other end connected to the suction side of the pump. A container connected to the delivery side of the pump receives the waste gas sample. The suction pipe is connected to the combustion engine with an equalizing tank communicating with the suction pipe. An air meter is connected in series with the equalization tank and a synchronizer is interposed between the air meter and the pump motor to regulate the speed of the pump motor proportionately to the speed of the air meter. (Author abstract modified)

19688 APTIC NO. 38366

Luft, Karl-Friedrich

NEW WAYS FOR THE CONTINUOUS DETERMINATION OF THE GAS COMPOSITION BY MEANS OF THE NON-DISPERSIVE INFRARED GAS ANALYSIS (DEMONSTRATED BY THE EXAMPLE OF THE DEGASIFICATION OF COALS). *(Neue Moeglichkeiten zur kontinuierlichen Erfassung der Gaszusammensetzung mit Hilfe der nichtdispersiven UR-Gasanalyse (gezeigt am Geispiel des Entgasungsverlaufs von Kohlen)). Text in German. Gas Wasserfach Gas Erdgas (Munich), 113(2):70-73, Feb. 1972. 3 refs. (Presented at the Erfahrungsaustausche der Gas-Chemiker, Konstanz, West Germany, 1971.)*

A new unit for the quasi-continuous determination of six components in a gas flow is described. The unit operates on the non-dispersive infrared principle. The radiation emanating from a source is alternately passed through two vessels and a conically shaped filter cuvette to the receiver. The rear wall of the receiver consists of a sinter metal disk which is in direct connection with a duct containing the gas which is to be analyzed. The pressure impulses created by radiation absorption are converted to electrical signals. The selectivity for a certain gas is obtained by filling the first vessel with nitrogen or a compensating gas the filter cuvette with a filter gas mixture. The radiation sent through the set-up is modulated to the absorption bands of the gas to be measured. The six components which the units is capable of analyzing are methane, carbon monoxide, carbon dioxide, ethane, ethylene, and acetylene. For carbon dioxide the largest measurement range is 0 to 1%, the smallest 0 to 20 ppm, for methane 5% and 0.1%. The unit was used for analyzing the gases developing at the pyrolysis of coal. The reproducibility of the measured values was better than 2%.

19689 APTIC NO. 37907

Lux, H. and H.-G. Daessler

METHODIC STUDIES OF THE LIESEGANG METHOD IN GASSING EXPERIMENTS WITH DEFINED SO2 CONCENTRATIONS. *(Methodische Untersuchungen zum Liesegang-Verfahren bei Begasung mit definierten SO2-Konzentrationen). Text in German. Z. Ges. Hyg. Ihre Grenzgebiete (Berlin), 18(2):81-87, Feb. 1972. 22 refs.*

For methodical studies of the Liesegang method the conventional porcelain Liesegang hoods were used with 3 to 5 mm thick and 14 cm high filter paper cylinders. The later were soaked with a 50 ml absorption solution consisting of calcium carbonate, aqua destillata, and glycerine DAB 7. In two cabins, the Liesegang filter were exposed to very different sulfur dioxide concentrations for the same period of time. Furthermore, the influence of the flow velocity of the air brushing by, and of the moisture content on the absorption capacity of the filters was studied. The height of the sulfur concentrations in mg S/100 hr exposure depended not only on the SO2 concentration and the wind velocity but also on the total exposure time. The measured values increased at the same concentration with increasing length of exposure. Since in the open air the exposure time, the concentration, and the wind velocity are unknown, the S-values cannot be converted into concentration values (mg SO2/cu m).

19690 APTIC NO. 38591

Maley, Lawrence, E.

RECENT DEVELOPMENTS IN CONTINUOUS ANALYTICAL INSTRUMENTATION FOR MEASUREMENT AND CONTROL OF POLLUTANTS. *Meas. Contr., 5(1):3-8, Jan. 1972. 1 ref. (Presented at the Institute of Measurement and Control, North West Kent Section, Symposium on the Measurement and Control of Industrial Pollution; Maidstone, England, April 28-29, 1971.)*

Important developments in instrumentation for pollutant measurement and control are a colorimetric analyzer for the measurement of mercury in water; a remote sensing correlation spectrometer for sulfur dioxide monitoring; and a suspended solids monitor for water or sewage. The mercury monitor first reduces ionic mercury to its elemental form in a scrubbing section. Absorbance of the scrubbed sample is then measured by an ultraviolet photometric detector at 253.7 millimicron. The normal concentration span of the instrument is O-10 ppb Hg. The initial development of the correlation spectrometer has been confined to the visible and ultraviolet portions of the spectrum. Light is collected by an astronomical telescope and docused onto the entrance slit. It is then dispersed through diffractor plates and focused onto the corrleation mask in front of a photomultiplier tube. The output from the photomultiplier tube is processed electronically to extract the signal in-phase with the diffractor plate oxcillation. Instrument output is recorded in units of parts/million m. The solids monitor measures the depolarization of scattered polarized light to determine particle concentrations in suspensions. These instruments are expensive but uniquely adapted for pollution control.

19691 APTIC NO. 38015

Marchio, J. L.

A DUAL-CHANNEL GC TECHNIQUE FOR MIXTURES OF PERMANENT GASES AND C1-C2 HYDROCARBONS. *J. Chromatographic Sci., 9(7):432-435, July 1971. 16 refs.*

A gas chromatographic (GC) system is described for the quantitative analysis of gas effluent containing hydrogen, oxygen, nitrogen, carbon monoxide, carbon dioxide, methane, ethylene, and acetylene in the presence of C3 hydrocarbons and heavier components. The system incorporates a dual-channel gas chromatograph complete with individual gas sampling valves and thermal conductivity detectors. One GC channel (A) measures hydrogen using a nitrogen carrier gas, while the second channel (B) uses helium carrier to determine the remaining C2 and lighter components. Channel A has one column that eludes only hydrogen prior to column backflushing. Channel B has two columns, the first of which completely separates CO2, ethylene, ethane, and acetylene before backflushing C3 and heavier components. The unresolved light fraction consisting of hydrogen, air, methane, and CO2 elutes from the first column into the second for complete separation of oxygen, nitrogen, CO, and methane. The total analysis time for the determination of C2 and lighter components in furnace gas effluent is 16-18 min. Analysis of 18-20 samples/8 hr/day is feasible.

19692 *APTIC NO. 38200*

Masuda, Yoshito and Tetsuya Kimura

ON THE MEASUREMENT OF THE INTENSITY OF ULTRAVIOLET RAYS. (Shigaisen no sokutei hoho). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):45, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

Since the measurement of absolute values of ultraviolet rays in relation to the occurrence of photochemical smog has become important, an instrument for measuring the intensity of ultraviolet rays and a method for recording them have been developed. Ultraviolet rays are detected by photoelectrons which convert the amount of rays into electric pulses, which are accumulated at one hour intervals and recorded in cal/sq cm. This principle is also applied to manufacture an instrument measuring the visible infrared as well as ultraviolet range and one to measure artificial lights, such as from a xenon lamp. An example of measurements taken on a day when photochemical smog occurred in Tokyo, is given.

19693 APTIC NO. 38548

McFarland, John H. and C. S. Benton

THE OXIDES OF NITROGEN AND THEIR DETECTION IN AUTOMOTIVE EXHAUST. *J. Chem. Educ., 49(1):21-24, Jan. 1972. 28 refs.*

Various methods for nitrogen oxide determination in automotive exhaust are reviewed with respect to properties of nitrogen oxides, experimental procedures, and applicability of the techniques. Acidimetric determination, the phenoldisulfonic acid method, dry absorption of NOx, p-anisidine test paper, photometry of azo dyes, spectrophotometric determination, nitrate-specific ion electrode determination, homogeneous chemiluminescence, gas chromatography, and sealed electrochemical sensors are briefly examined.

19694 APTIC NO. 38159

McNesby, J. R. and R. Byerly, Jr.

MEASURES FOR AIR QUALITY, ANNUAL REPORT--FY 1971. *Natl. Bur. Std. (U. S.) Tech Note, No. 711:i-iv, 1-7, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

The Measures for Air Quality Program of the National Bureau of Standards is a research effort to advance the science of air pollution measurement. In its first year of activity, the program identified the major measurement problems as sulfur dioxide, particulates, nitrogen oxides, and ozone, with hydrocarbons and carbon monoxide of second priority. Significant advances were made in two general areas: new measurement techniques and development of standard reference materials for calibration of monitoring instruments. Among the more definitive advances made during the first year were construction of the first apparatus capable of measuring particle size distribution in less than 1 min; experimental measurements (of fluorescence and quenching) necessary for the design of a specific, interference-free, real-time apparatus for measuring SO2 in the ppm region; and standard reference materials for monitoring ambient SO2 and CO. In all, 23 projects are in progress.

19695 APTIC NO. 38160

McNesby, J. R., R. Byerly, Jr., D. Jennings, and B. Woodward

OPTICAL MEASUREMENT OF PARTICLE SIZE DISTRIBUTIONS. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:8-12, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

The feasibility of determining size distributions of suspended particulates by means of laser light scattering was tested in a computer simulation program. Scattering data for spherical particles with a single known index of refraction were calculated using several representative size distributions as input. From the calculated data, various size distributions were computed. These routines gave reasonable solutions for moderately complicated distributions. If the actual experiment yields data of comparable quality, the results will represent a striking advance in the particle sizing field.

19696 APTIC NO. 38161

McNesby, J. R., R. Byerly, Jr., and C. C. Gravatt

DETERMINATION OF THE SIZE DISTRIBUTION OF AIRBORNE PARTICULATE MATTER IN REAL TIME BY A LIGHT SCATTERING METHOD. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:13-15, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

The size distribution and chemical composition of particulate matter is to be studied by the simultaneous measurement of the intensity of light scattered by a single particle at two small scattering angles as it is borne by air flowing through a scattering chamber. The radius of particle gyration will be determined since the ratio of the two scattered intensities is proportional to the radius, independent of its index of refraction. Single pulse counting will give number densities. With two wavelengths of light, it will also be possible to determine the index of refraction and thus gain information related to particle chemical composition. For the determination of the radius of gyration, an optical system was constructed that employs a 3 mw helium-neon laser as a source and an annular ring scattered light system which monitors scattering at 5 and 10 deg. An analog electronic system was developed to generate a pulse, proportional to the rato of the two scattered intensities, that will be counted in a multichannel analyzer.

19697 APTIC NO. 38162

McNesby, J. R., R. Byerly, Jr., David H. Freeman, Walter L. Zielinski, Jr., Rosalie M. Angeles, Delmo P. Enagonio, Edwin C. Kuehner, and Herbert D. Dixon

SEPARATIONS AND IDENTIFICATION OF CARCINOGENS ADSORBED ON PARTICLES. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:16-19, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

Efforts were made to synthesize a suitable gel network for the chromatographic separation of polynuclear aromatic hydrocarbons such as benzo(a)pyrene (BaP). The work included a study of solute:gel interactive processes. A proton acceptor gel, crosslinked polyvinylpyridine, interacted strongly with protn donor solutes. The protons in an aromatic system were too weakly acidic for successful polynuclear aromatic hydrocarbon separation by this gel. Silver nitrate bound onto a polyvinylpyridine gel gave negligible BaP interaction, but a porous cation exchanger in silver ion form shows good compatibility with organic solvent systems. The material gave a pronounced separation factor for weak pi electron donors (benzene, anthracene) from the stronger base BaP. The synthetic development and testing of refined gel network structures is continuing. The basis for this technique is the ability of organic solutes to form a complex.

19698 APTIC NO. 38163

McNesby, J. R., R. Byerly, Jr., and John K. Taylor

PARTICULATE REFERENCE MATERIAL. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:20-21, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

A small sample of particulate matter collected in New York as used to develop a methodology for the certification of an atmospheric particulate reference material. Such material is needed to evaluate the reliability of chemical analysis of particulate matter. Sample measurements included: morphology;

general descriptive data; elemental analysis by emission spectroscopy, atomic absorption spectroscopy, polarography, spectrophotometry, and neutron activation analysis; anion determinations by wet chemical methods; and group determinations of organic constituents. All studies showed that it is feasible to produce a particulate reference material.

19699 APTIC NO. 38165

McNesby, J. R., R. Byerly, Jr., Charles M. Hunt, and Barry C. Cadoff

INDOOR AIR POLLUTION. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:24-25, 73, Jan. 1972. 12 refs.*

GPO: C 13.46:711

A simple model of an air-conditioned building with forced air ventilation was developed for computation of the steady-state ratio of indoor to outdoor pollutants and the rate at which steady state is approached. The model also provides a basis for analyzing the effects of changing parameters, such as the relative amounts of recirculated and fresh air or the efficiency of an air-cleaning system, on indoor/outdoor pollutant relationships. A tracer technique using sulfur hexafluoride and an electron capture detector is being evaluated as a tool for measuring flow rates in buildings and elsewhere. Preliminary indoor-pollution measurements indicated the constant presence of lead as a trace element in indoor dust, the presence of ammonium sulfate, and the differences in the infrared spectra of indoor and outdoor dust.

19700 APTIC NO. 38167

McNesby, J. R., R. Byerly, Jr., J. J. Ritter, and R. C. Paule

MOLECULAR COMPLEXES OF GASEOUS POLLUTANTS. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:29-32, 73, Jan. 1972. 12 refs.*

GPO: C 13.46:711

The preparation of nitric oxide standards will be studied using a polytetrafluoroethylene permeation tube and a reducer module NO generator. Preliminary experiments indicate that acceptable NO permeation rates are obtainable using NO gas at atmospheric pressure and NO over a solution of cuprous chloride as gas sources. A suitable NO source remains to be found. Development of the reducer module requires selection of a suitable reaction system capable of converting nitrogen dioxide to NO at a definite stoichiometry and low levels of incident NO2. Three systems have been evaluated: reaction with hydrogen over a platinized alumina catalyst; reaction with manganese oxide; and reaction with copper. The catalyst system was extremely sensitive to operating parameters; the MnO system was effective for the reduction of NO2 to N20; the Cu system reduced NO2 to NO but not without considerable loss of nitrogen oxides. In addition to the problem of NO standards, the suitability of mercury-encapsulated gas bubbles as certifiable standards for sulfur dioxide will be investigated.

19701 APTIC NO. 38168

McNesby, J. R., R. Byerly, Jr., James E. Fearn, Joseph M. Antonucci, and Roland E. Florin

FRICTIONAL DEGRADATION OF RUBBER. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:33-36, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

An apparatus for studying the degradation of rubber was constructed and tested. The apparatus consists of a glass cylinder through which a steel shaft carrying the rubber sample is introduced by employing a ferro-fluid feedthrough seal coupled with steel bellows. This arrangement permits translational motion of the shaft while maintaining a hermetic seal. The shaft is connected to a drill press that maintains a constant load on the sample and a constant angular velocity. Side arms on the glass cylinder permit sample withdrawal in any desired fashion and the admission of any desired atmosphere. Preliminary experiments included the abrasion of a polyisoprene prototype in a helium atmosphere under 1 to 5 lb loads for 30 min or less. Very little evidence of light volatile material was indicated from a gas-liquid chromatographic examination of the system. Placing greater weight on the sample produced shredding. This abraded material showed solubility to benzene in contrast to the total insolubility of the original sample. Analysis of the benzene solution suggested the presence of a low concentration of isoprene.

19702 APTIC NO. 38169

McNesby, J. R., R. Byerly, Jr., and Melvin Linzer

MODULATED INFRARED LASER ABSORPTION TECHNIQUES FROM ATMOSPHERIC POLLUTANT MEASUREMENTS. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:37-38, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

Design criteria were developed for a frequency-modulated laser absorption instrument. The proposed device would have the capability of detecting and quantitatively measuring extremely small concentrations of pollutants, even in the presence of large atmospheric and optical system losses. Both very short and very long path measurements, as well as long-range lidar measurements, would be possible. Construction of an experimental instrument is not planned, but an experiment pertinent to the objective of the theoretical study has been scheduled. A raman spin-flip laser source will be used in conjunction with an opto-acoustic detector to measure infrared absorption in dimethylmercury.

19703 APTIC NO. 38170

McNesby, J. R., R. Byerly, Jr., Walter Braun, A. M. Bass, and A. Ledford

ATOMIC EMISSION DETECTOR. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:39-40, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

An absolute detector was developed for measurements of gaseous air pollutants. An air sample injected into a helium stream is separated into its constituents by gas chromatography. The effluent gas stream is subject to a microwave discharge and the emission from the excited atoms is measured. The detector is absolute; sulfur-containing molecules gave a signal at the sulfur emission line proportional to the concentration expressed as sulfur atoms. Carbon-containing atoms behaved in a similar fashion. Carbon monoxide and nitric oxide were measured.

19704 APTIC NO. 38175

McNesby, J. R., R. Byerly, Jr., and H. A. Gebbie

FAR IR CARBON MONOXIDE MONITOR. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:53-55, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

A far infrared monitor for carbon monoxide in automobile exhausts has a nonresonant cavity absorption cell for enhanced absorption and a stepped mirror interferometer for increased selectivity. The steps are designed to match specific parameters of the CO molecule. The output of the detector is a direct measure of the amount of gas in the cavity. The limit of detection of the prototype is approximately 0.3% CO.

19705 APTIC NO. 38180

McNesby, J. R., R. Byerly, Jr., and H. Okabe

FLUORESCENCE DETECTOR FOR SO2. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:64, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

A study of sulfur dioxide fluorescence stimulated by radiation at 200-230 nm demonstrated that fluorescence is still measurable in ambient air and that SO2 can be measured at ambient

concentrations. Fluorescence intensity was measured as a function of the wavelength and pressure of air to determine quenching efficiencies by oxygen and nitrogen. Absorption coefficient measurements indicated a 9 times 10 to the minus 9th power sec lifetime for excited SO2. The results show that construction of a prototype fluorescence detector for SO2 is warranted.

19706 APTIC NO. 38181

McNesby, J. R., R. Byerly, Jr., Ernest E. Hughes, William D. Kinard, and Rolf A. Paulson

NITRIC OXIDE SRM DEVELOPMENT. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:65-66, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

A chemiluminescent system was assembled to study the suitability of nitric oxide-nitrogen mixtures in cylinders as standard reference materials for source testing. The operation of the system was checked using the ozone-ethylene reaction. Apparatus for utilization of the ozone-nitric oxide reaction is being completed. Studies of the stability of NO-N2 mixtures in steel cylinders are in progress.

19707 APTIC NO. 38182

McNesby, J. R., R. Byerly, Jr., G. A. Dines, R. M. McCabe, and M. L. Greenough

INSTRUMENTATION ASSISTANCE TO THE NATIONAL AIR POLLUTION CONTROL ADMINISTRATION. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711: 67, 73, Jan. 1972. 11 refs.*

GPO C 13.46:711

Magnetic tape data from six Continuous Air Monitoring Project stations of the Environmental Control Administration will be processed by the National Bureau of Standards. The software developed for the processing will yield summaries output on paper and detailed output on microfilm.

19708 APTIC NO. 38183

McNesby, J. R., R. Byerly, Jr., John Taylor, and E. Hughes

THE SULFUR DIOXIDE PERMEATION TUBE. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:68-69, 73, Jan. 1972. 12 refs.*

GPO: C 13.46:711

An evaluation of Teflon sulfur dioxide permeation tubes as standard reference materials showed that the tubes are useful subject to stringent temperature and flow control. The time taken to reach a constant permeation rate after removal from storage at -20 to -30 C varied from 24-48 hr. At least 24 hr were required to achieve reliable equilibration following a temperature change. Other parameters investigated were the effects of grease accumulation on tube exterior, exposure to water, and purity of SO2.

19709 APTIC NO. 38184

McNesby, J. R., R. Byerly, Jr., John Taylor, and E. Hughes

THE NITROGEN DIOXIDE PERMEATION TUBE. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:70, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

The suitability of nitrogen dioxide permeation tubes as standard reference materials was studied. Permeation rates of commercial tubes were not independent of time and were inconviently high for ambient air applications. Reduced rates were obtained by means of a new design--the microbottle. This is an impermeable glass tube capped with a Teflon disc through which NO2 permeates. Moist air depressed the permeation rate and produced blistering of the tube. The introduction of phosphorus anhydride into the microbottle reduced the rate of the drop in permeation rate by an order of magnitude.

19710 APTIC NO. 38185

McNesby, J. R., R. Byerly, Jr., John Taylor, and T. Mears

OZONE. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:71, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

An ultraviolet ozone light source (output at 184.9 nm) is combined with a quartz tube through which air flows at a measured rate. By exposing controllable fractions of the air to the light, varying concentrations of ozone are produced in the air stream. The absolute standard for measurement of the amount of 03 produced is the neutral buffered potassium iodide method. Research is in progress to define the conditions under which the light source can be incorporated in to a device usable as standard reference material for ozone measurement.

19711 APTIC NO. 37903

Melngailis, Ivars

THE USE OF LASERS IN POLLUTION MONITORING. *IEEE (Inst. Elec. Electron. Engrs.) Trans. Geosci. Electron., 10(1):7-17, Jan. 1972. 47 refs. (Presented at the Institute of Electrical and Electronics Engineers Geoscience Electronics Symposium, Washington, D. C., Aug. 25-27, 1971.)*

Optical techniques have opened up new possibilities in air pollution monitoring because of their remote-sensing capabilities, very high specificity, and short observation time. Techniques involving the use of lasers include Raman scattering, fluorescent emission either from resonantly excited or hot gases, thermal radiation, and resonant absorption. Unique advantages in these applications are provided by tunable lasers, including organic dye lasers, parametric oscillators, spin-flip Raman lasers, and semiconductor lasers. The absorption technique was tested in the laboratory using tunable diode lasers to measure high resolution spectra for sulfur hexafluoride, ammonia, and ethylene at 10.6 micron, sulfur dioxide at 8.6 micron, carbon monoxide at 4.7 micron, and nitric oxide at 5.2 micron. The ethylene content of automobile exhausts was measured by a derivative technique. A 10 cm long gas cell was proved sufficiently sensitive to detect 1 ppm of NH3 in the air; the 50-100 kHz resolution of diode lasers is about four orders of magnitude better than that of conventional spectrometers and more than adequate to resolve Doppler broadened gas absorption lines on the order of 100 MHz wide. Diode lasers can also be tailored to emit near a vibrational transition of any pollutant by choosing the appropriate composition of one of several compound semiconductors. They can be fine tuned by simply changing the diode current and could be incorporated in a simple compact monitoring system. (Author abstract modified)

19712 APTIC NO. 38379

Mokhov, L. A., N. S. Mareyeva, and N. Ya. Shuinova

STABILIZATION A BARIUM SULFATE SUSPENSION DURING THE DETERMINATION OF A SULFURIC ACID FOG IN AIR. *(O stabilizatsii vzevesi sulfata bariya pri opredelenii tumana sernoy kisloty v vozdukhe) Text in Russian. Lab. Delo, no. 11:651-653, 1971. 1 ref.*

The addition of 25% glycerol to 0.01 N sodium hydroxide solutions stabilized the barium sulfate precipitate (for absorbance readings) formed in the solution with barium chloride at sulfuric acid concentrations of 0.01-0.7 mg in comparison with the BaSO4 precipitate in 0.01 N NaOH solution free of glycerol. The light transmittance factor was more uniform for the glycerol-containing solutions at all H2S04 concentrations.

19713 APTIC NO. 37918

Morris, Charles William and John Raymond Ulyate

METHOD AND APPARATUS FOR MASS EMISSION SAMPLING OF MOTOR VEHICLE EXHAUST. *(Chromalloy American Corp., West Wyack, N. Y.) U. S.*

Pat. 3,603,155. 10p., Sept. 7, 1971. 4 refs. (Appl. Feb. 2, 1970, 22 claims).

Methods and apparatus are presented for maintaining a constant mass or weight flow of diluted exhaust gases through a test apparatus, to obtain a true proportional sample, unlike previous methods, which failed to eliminate the effects of varying temperatures and volumes of exhaust gas in the different test modes. A valve is provided within the flow-through duct for modifying the initially established volumetric flow rate in response to changing exhaust gas temperatures. A temperature sensor and transducer are provided in association with the duct for producing a signal which is a function of the temperature of the exhaust gases. A volumetric flow rate sensor and transducer are also associated with the duct for producing a second signal which is a function of the volumetric flow rate. An electrical circuit is provided to cause the second signal to modify the first signal to adjust the valve.

19714 APTIC NO. 38322

Muramatsu, Fumio, Yukio Otsuka, and Yasuji Himi

SOME PROBLEMS OF HIGH VOLUME AIR SAMPLER FOR AT. CU DETERMINATION. *(Hai boryumu ea sanpura ni yoru taikichu no do no teiryo no mondaiten). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):91, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)*

The problem that obtained values show too much variation accompanying the determination of copper using high volume air samplers was examined. Since some copper may be due to the friction of the rotor by carbon brushes of a motor used for the sampler, two high-volume air samplers were connected in series; another dust sampler using filter paper and a vacuum pump with an induction motor were placed around the former. Dust from the first high-volume sampler, the second one, and the latter samplers were analyzed by means of atomic absorption spectrophotometry. The ratio of the copper concentration in samples obtained by the first high-volume sampler to that obtained by the second was 50 to 100%. The values obtained by samplers using an induction motor decreased as they increased in distance from the high volume sampler and become constant beyond 3 to 6 m from the latter.

19715 APTIC NO. 36916

Nagai, Takeshi, Tomo Hattori, Takao Nagano, and Yoshifumi Ukijima

STUDY OF THE INFLUENCE OF HYDROGEN SULFIDE (I). A SIMPLE METHOD FOR THE HYDROGEN SULFIDE PAPER BADGE. *(Ryuka suiso no eikyo ni kansuru kenkyu daiippo, kenchi bacchi ni yoru ryuka suiso no kani sokutei. Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6 (1):77, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)*

A simpler and less expensive, although less accurate, method than conventional ones to determine hydrogen sulfide was developed. Filter papers were immersed in solutions of different concentrations of silver nitrate, lead nitrate, and lead acetate and solutions alkalized with ammonium carbonate and dried in air When these papers were exposed to hydrogen sulfide of 4.25 ppm for one hour, papers immersed in 5% lead acetate solution (without alkalization) gave best result. In addition, this lead acetate paper gave a distinct change in color with hydrogen sulfide concentration changes, had good reproducibility of color, and were not disrupted by methyl mercaptan, sulfur dioxide, and direct sunlight.

19716 APTIC NO. 38486

Nakasa, Hiroyasu

APPLICATIONS OF NON-DESTRUCTIVE ACTIVATION ANALYSIS TO ELEMENT SURVEY IN AIR AND NATURAL WATER. *(Taiki-chu oyobi shizensui-chu no biryo genso gaikan bunseki eno hi-hakai hoshaka bunseki no tekiyo). Text in Japanese. Denryoku Chuo Kenkyusho Gijutsu Kankyusho Hokoku (Tech. Lab. Central Res. Inst. Electric Power Ind., Rept.), 1971:1-30, Feb. 1971. 7 refs.*

Various conditions for application of neutron activation analysis of trace elements in air and natural water were studied, and the applicability and sensitivity of identification where shown based on calculation and measurement. Samples were irradiated for 0.5, 5, 50, and 500 min and estimated by a spectrometer. The applicability of this method to 73 kinds of elements was observed. This method was applied to the analysis of samples of air-borne particulate matter, snow, and water. Quantitative values of trace substances in various filters and viscous agent for collecting samples were also shown.

19717 APTIC NO. 38100

Nakaya, Syu and Masakichi Nishimura

DETERMINATION OF BORON IN THE AIR. *(Kukichu no hose no teiry-ho). Text in Japanese. Bunseki Kagaku (Japan Analyst) Tokyo, 20(8): 967-970, Aug. 1971. 7 refs.*

A method for the determination of boron in the air is presented. About 1000 l of air is passed at a rate of 2-3 l/min through a series of four collecting glass tubes chilled in a dry ice methanol bath. The boron collected in each tube is dissolved with 10 ml of water; 1.5 ml of curcumin reagent solution and 2-3 drops of saturated oxalic acid solution are then added. The solution is evaporated in a platinum dish on a water bath until the odor of phenol disappears. The residue is dissolved in 10 ml of ethanol and the absorbance is measured at 548 millimicron. The method is a modified colorimetric technique.

19718 APTIC NO. 38107

Oka, Syotaro, Masao Tanaka, and Kazuo Ogawa

CONDUCTOMETRIC SULFUR DIOXIDE ANALYZER PICOFLUX FOR AIR POLLUTION MONITORING. *(Taikiosen kanshi yo yoeki dodenritsu aryusangasu bunseki kei Pikofurukkusu). Text in Japanese. Shimazu Hyoron (Shimazu Rev.), 28(2):129-133, July 1971. 2 refs.*

The construction, specification, and characteristics of the conductometric sulfur dioxide analyzer were stated. The equipment measures SO2 in the air by the increase of conductivity of sulfuric acid which is produced when SO2 is absorbed in the solution of hydrogen peroxide. The measurement is continuous, and the sample air and reaction solution flow at a constant flow rate for the reaction. Since the storage tank is of Mariotte bottle construction, atmospheric pressure is maintained at the outlet to the reaction solution tank regardless of the increase or decrease of the reaction solution. The principal parts of the equipment such as electrodes, reaction columns and capillaries are held in a thermoregulated tank of 40 C, designed for use under outside temperatures of -3 to 32 C. Many frames are built in the tank so that no vibrations would affect the surface of the reaction solution when the Picoflux is installed in a pollution monitor car. The range of measurements is 0 0.4, 0 - 1, and 0 - 2 ppm SO2, and the precision is + or - 5% of full scale. The 90% responding time is 50 100 sec, the flowing amount of gas, 50 l/hr, and the flowing amount of reaction solution, 40 cc/hr. The analyzer is excellent in linearity of indication, and recording data as well as indicating characteristics are given.

19719 APTIC NO. 38321

Okita, Toshiichi

COMPARATIVE MEASUREMENTS OF ATMOSPHERIC PARTICULATE MATTER USING VARIOUS SAMPLERS STUDY GROUP FOR STANDARD MEASUREMENT METHODS OF ATMOSPHERIC PARTICULATE. *(Kosanran ruyshi nodoho, tepu ea sanpura-ho, roshi juryo nodo-ho ni yoru taikichu fuyu ryushijo busshitsu nodo no* *hikiku sokutei). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):90, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)*

A comparison among various methods determining air-borne particulates was made in order to find a reliable method which continuously monitors the environmental concentration of particulates for establishing a standard. The weight concentration at particulates was determined on samples collected by means of a low volume air sampler (glass fiber filter with a diameter of 5 cm and a 20 l/min flow rate) after eliminating particulates larger tha 10 micron by a gravitational sedimentation type separator. At the same time, the particulate concentration was determined by means of a light dispersion type particulate concentration meter (a so-called digital dust meter) and a tape air sampler measuring points were in Ichihara-shi in Chiba Prefecture, Tokyo, Osaka, and Kobe. The degree of correlation decreased in the following order: the relationship between the weight concentration and values obtained by the light dispersion type meter, the transmission rate of the tape, and the reflection rate of the tape.

19720 APTIC NO. 38553

Orlovskaya, A. M., Z. K. Olkhovskaya, E. M. Shein, and F. S. Nulman

COMPARATIVE ASSESSMENT OF THE METHOD OF DETERMINING PHENOL IN THE AIR IN THE PRESENCE OF FORMALDEHYDE. *(Sravnitelnaya otsenka metoda opredeleniya fenola v vozdukhe v prisutstvii formaldegida). Text in Russian. Gigiena i Sanit., 36(10):109-110, 1971.*

Phenol-formaldehyde moulding powders contain 20% nonpolymerized phenol and formaldehyde which pollute the air during processing. There are two different methods for determining phenol in air, using Millon's reagent and a nitrozo compound, respectively. The latter method is disturbed by the presence of cresol in the air. In Millon's method, the presence in air of formaldehyde causes sample and standard solution colorations to be different. Therefore the possibility of using the above methods for phenol determination in the presence of formaldehyde was investigated experimentally, and a comparative assessment of both methods applied in the presence of formaldehyde was performed. Tests with known phenol concentrations of 1-10 micrograms with simultaneous formaldehyde concentrations of 1-3 micrograms showed different colorations of the sample and standard solution with Millon's reagent, indicating that this method is not suitable for colorimetric determination. With the same ratios of the phenol and formaldehyde concentrations, the nitrozo method gave coinciding coloration of sample and standard solution, i.e., formaldehyde had no disturbing effect on the determination. This result was confirmed also by gas-air analysis.

19721 APTIC NO. 38032

Pecsar, R. E. and C. H. Hartman

AUTOMATED GAS CHROMATOGRAPHIC ANALYSIS OF SULFUR POLLUTANTS. *Anal. Instrum., vol. 9:H-2-1 to H-2-14, 1971. 7 refs.*

Analysis for sulfur-containing pollutants is becoming mandatory in operations such as kraft paper mills, fossil fuel burning power stations, and petrochemical refineries. Gas chromatography is a versatile tool for accomplishing this analysis in the normal ppb-ppm concentration range. Typically an all-Teflon flow system is employed with detection by flame photometry. For best performance the flow rates to the detector should be preset to the optimum value of 88 cc/min air carrier, 80 ccm/min of hydrogen, and 20 cc/min of makeup air for flame stability. By utilizing air as the carrier, the disruptive effect of the air peak is eliminated and 12 ft of column suffices for an adequate separation of hydrogen sulfide, sulfur dioxide, and methyl mercaptan. In addition to the column and detector, care must be paid to the analyzer flow system and the electrical processing of the detector signal. An analyzer provides continuous, unattended analysis. Sulfur dioxide values measured with such a system in the San Francisco area appeared more reliable measurements than with a conductometric analyzer.

19722 APTIC NO. 38698

Pilat, Michael J., David S. Ensor, and John C. Bosch

CASCADE IMPACTOR FOR SIZING PARTICULATES IN EMISSION SOURCES. *Am. Ind. Hyg. Assoc. J., 32(8):508-511, Aug. 1971. 18 refs.*

The design, application, and operation of a cascade impactor for measuring the size distribution of particulates in stacks and ducts are reviewed. The apparatus was used for source sampling in a coal-fired power plant, a kraft pulp mill recovery furnace, a fluidized bed sewage sludge incinerator, and a plywood veneer drier. The characteristics of the impactor include isokinetic sampling capabilities, prevention of water losses and water vapor condensation, structural ruggedness, and the ability to determine the aerosol size distribution with a minimum of effort and expense. (Author abstract modified)

19723 APTIC NO. 38361

Plankert, Manfred

THE DETERMINATION OF ORGANICALLY BOUND SULFUR IN COKE OVEN GAS. *(Zur Bestimmung des organisch gebundenen Schwefels im Koksofengas). Text in German. Gas Wasserfach Gas Erdgas (Munich), 113(2):65-69, Feb. 1972. 12 refs. (Presented at the Erfahrungsaustausche der Gas-Chemiker, Konstanz, West Germany, 1971.)*

Since the concentration of organic sulfur in gas has been limited an analytical method had to be found which permits a fast and accurate determination in the cleaned and uncleaned gas. A combination of the reduction method with the Draeger indicator tube for hydrogen sulfide was tested. The gas sample is passed through a cadmium acetate solution where the H2S is retained. A certain measured volume is then passed over a platinum catalyst at 1000 C. The organic sulfur is entirely converted to H2S at this temperature, provided the hydrogen concentration and the residence time at the catalyst are sufficiently large. The apparatus consists of the gas entrance section, the measuring buret, the reactor and the indicator. The gas entrance section has a scrubber. The reactor is composed of a quartz tube with a length of 150 mm and a diameter of 10 mm. A sample volume of about 300 ml suffices for the determination, the whole measuring process lasts less than 5 min. Reproducible values were obtained which agreed well with the results of parallel measurements by the method of Roelen/Feisst.

19724 APTIC NO. 37981

Principe, Andrew H. and Emmett P. Glynn

GAS SAMPLING APPARATUS AND METHOD. *(Assignee not given.) U. S. Pat. 3,618, 393. 4p., Nov. 9, 1971. 4 refs. (Appl. Feb. 27, 1969, 8 claims).*

An apparatus and method are proposed for taking samples of suspect gases, such as the breath of alveolar of deep lung air of druken driving suspects and drugged race horses, gaseous products of combustion from suspected arsons and explosions, and air polluted by commercial exhausts. Previous devices that have found acceptance are not portable, and there are no means available for reproducing the test as it applies to the particular suspect. The sample securing device of the present method comprises an evacuated canister having an inlet, a valve which controls the inlet and accommodates the selective intake of gas into the canister, and a septum for hypodermic extraction of gas from the canister. The sample may then be tested by gas chromatography. (Author abstract modified)

19725 APTIC NO. 38711

Prinz, Bernd

STUDIES ON THE TIME - DEPENDENT EMISSION PATTERN BY MEANS OF SPECTRAL ANALYSIS. *(Untersuchungen zeitlicher Immissionsverlaeufe Mit Hilfe spektralanalytischer Methoden). Text in German. Staub, Reinhaltung Luft, 32(1):26-29, Jan. 1972. 6 refs.*

Time-dependent pollutant concentration patterns such as continuous atmospheric sulfur dioxide monitoring data belong to the so-called stochastic processes according to statistical terminology. Therefore spectral analysis is considered to be the most suitable mathematical approach in the evaluation of the statistical regularities and relationships behind the pollutant measurement data. A distinction between periodicity and incidental variations of the pollutant concentration can thus be achieved. Furthermore, a relationship between the variance of a measurement data sample and measurement time interval can be established by use of auto-correlation diagrams. An example applied to data accumulated from 5 yrs of continuous atmospheric SO2 monitoring in cities of the Ruhr region is included.

19726 APTIC NO. 38221

Rabinovich, L. M., A. M. Nepomnyashchiy, A. S. Grischenko, and L. N. Panchenko

SPECTROPHOTOMETRIC DETERMINATION OF ALDEHYDES IN THE AIR. *(Spektrofotometricheskiy metod opredeleniya al degidov v vozdukhe). Text in Russian. Gigiena i. Sanit., 36(8):75-76, Oct. 2, 1971.*

On addition of acid, the color produced by formaldehyde (CH2O) and fuschsin reagent shifts in wavelength but not in intensity. A new method for determing CH2O and ths sum of other aldehydes in mixtures involves measuring absorption at 580 nm 60 min after the addition of the reagent, then adding 1 ml of 1:3 sulfuric acid and determining absorption at 580 nm. The error of the determination on separate occasions is plus or minus 10%.

19727 APTIC NO. 38477

Radulescu-D. N., M. Borda, L. Nagy, and C. Vasilescu

CONTRIBUTION TO THE QUANTITATIVE DETERMINATION OF QUARTZ IN DUSTS WITH THE AID OF INFRARED SPECTROSCOPY - APPLICATION TO LIME. *(Beitrag zur quantitativen Bestimmung des Quarzes in Staeuben mit Hilfe der Infrarot-Spektroskopie - Anwendung auf Lehm). Text in German. Z. Ges. Hyg. Ihre Grenzebiete (Berlin), 17(12):877- 881, Dec. 1971. 7 refs.*

Standard quartzes of the type Minas Geraes with average grain sizes of 2.4 and 6.5 micron, as well as clay dusts were used for a spectroscopic examination in the infrared range. The dusts were crushed for 20 hr so that the granulation was smaller than 8 micron. Aliquote fractions of the dusts were subjected to thermal treatment for 2 hr at temperatures of 200, 350, 500, 650, 800, and 950 C. The determination was carried out with a Recorder Shimadzu Infrared Spectrophotometer Type IR G 2. The method by Gade with potassium bromide tablets for spectroscopy was used. The tablets were 200 mg heavy and had a diameter of 13 mm. They contained about 0.5 to 1.0 mg standard quartz or dust. The chemical method which was used for the quantitative determination of the quartz was based on the decomposition of the silicates by pyrophosphoric acid at a temperature of 250 C. The quartz was then gravimetrically determined. The radiographic determination, the method by Higgins was used. Infrared spectroscopy is better suitable for the determination of quartz in dusts than the chemical or radiographic methods. With infrared spectroscopy the standard error was 0.6%. For the successful application of the infrared spectroscopy, however, the dusts must have grain sizes of less than 8 micron. The preliminary thermal treatment shall take place at optimum temperatures which must be found ahead of the treatment.

19728 APTIC NO. 38016

Rajwar, D. P., S. K. Ghosh, and A. K. Ghosh

USE OF CARBON MONOXIDE DETECTOR TUBES DEVELOPED AT CMRS FOR ESTIMATION OF VERY LOW CONCENTRATION OF THE GAS. *J. Mines Metals Fuels, 18(2):334,340, Sept. 1970. 2 refs.*

An investigation was carried on the possibility of employing carbon monoxide detector tubes of the type marketed by Mine Safety Appliances Ltd., according to a patented process developed at the Central Mining Research Station in India, for the colorimetric estimation of very low concentrations of the gas. Traps were used for removing traces of moisture before introducing the sample to the detector tube. The experimental apparatus contained fused calcium chloride and carbosorb in series. The test samples were analyzed in the Graham-Lawrence apparatus and, for very low concentrations of the gas, a gas chromatographic apparatus employing a nickel-hydrogenating catalyst and a flame ionization detector was employed. An extension of the manufacturer s color chart reads very low concentrations of the toxic gas.

19729 APTIC NO. 38215

Randerson, Darryl, Joe G. Garcia, and Victor S. Whitehead

PHOTOGRAMMETRIC AND PHOTOMETRIC INVESTIGATION OF A SMOKE PLUME VIEWED FROM SPACE. *J. Appl. Meteorol., 10(6):1122-1131, Dec. 1971. 11 refs.*

Detailed analyses of an Apollo 6 stereographic photograph of a smoke plume which originated in southern Arizona and crossed over into Mexico are presented to illustrate how high-resolution photography can aid meteorologists in evaluating specific air pollution events. Photogrammetric analysis of the visible smoke plume revealed the plume was 8.06 miles long and attained a maximum width of 4000 ft, 3.0 mi from the 570 ft chimney emitting the effluent. Stereometric analysis showed that the visible top of the plume rose nearly 2400 ft above stack top, attaining 90% of this total rise 1.75 miles downwind from the source. Photometric analysis of the plume revealed a field of plume optical density that portrayed leptokurtic and bimodal distributions rather than a true Gaussian distribution. A horizontal eddy diffusivity of about 650,000 sq cm/sec and a vertical eddy diffusivity of 230,000 sq cm/sec were determined from the plume dimensions. Neutron activation analysis of plume samples revealed the elemental composition of the smoke to be copper, arsenic, selenium, indium, antimony, with trace amounts of vanadium and scandium. (Author abstract)

19730 APTIC NO. 38358

Reichner, Philip

GAS ANALYSIS METHOD. *(Westinghouse Electric Corp., Pittsburgh, Pa.) U. S. Pat. 3,620,931. 6p., Nov. 16, 1971. 5 refs. (Appl. Nov. 12, 1968, 7 claims).*

The design criteria and operating procedure of a gas analysis method for the continuous and quantitative determination of the proportion of one gas e.g., carbon dioxide, in a mixture of gases are presented. Previous techniques have been based on the properties of the gas to be measured; as such, costs greatly increased when more than one gas was to be measured. Prior devices have also been limited to samples of relatively constant compositions. The present method provides for continuous measurement of the concentration of a constituent gas in a mixture of gases and for continuous sampling of the initial gas mixture. The gas mixture is divided into two streams for selectively removing the constituent gas in one of the streams to form a second mixture. The partial pressure of the second component of the mixture and of the second mixture are then determined and compared. The difference in partial pressures is related to the quantity of the constituent gas in the initial mixture. (Author summary modified)

19731 APTIC NO. 38541

Ruskin, R. E.

CONSIDERATIONS IN THE MEASUREMENT OF POLLUTION EFFECTS ON THE NUMBER CONCENTRATION OF CLOUD CONDENSATION NUCLEI. *J. Appl. Meteorol., 10(3):994-1001, Nov. 15, 1971. 18 refs.*

Pollution effects on cloud condensation nucleus concentration vary widely, sometimes even decreasing the CCN. The interpretation of these effects may be invalid if the nuclei are measured by expansion-type Aitken nucleus counters operated at low expansion ratios. The expansion-type instrument has about a 26% supersaturation at an expansion ratio such that its photoelectric readout indicates a concentration of natural nuclei equal to the count from a diffusion chamber operating at 1% supersaturation. The maximum supersaturation in clouds is typically 0.1-1%; therefore, 26% causes a large positive error. Further, vapor depletion in the instrument during droplet growth limits the growth rate and size of droplets at supersaturations which are low compared to those for which the instrument is designed. Therefore, use of the standard calibration curve contributes a large negative error in the readout. An experimental development model of a continuous mixing-jet type instrument for CCN exhibited the same tendency, reading 0.04-0.03 of the thermal-gradient diffusion cloud chamber average with sodium chloride and eight times too high with Teflon. If further developments can correct the uncertainties in this instrument, it promises to be convenient and continuous. Interpretations of data on CCN in pollution should be evaluated in terms of the supersaturation at which the data are taken as compared to that in clouds. (Author abstract modified)

19732 APTIC NO. 38425

Saltzman, B. E., W. A. Cook, B. Dimitriades, E. E. Ferrand, E. L. Kothny, L. Levin, and P. W. McDaniel

TENTATIVE METHOD OF ANALYSIS FOR NITRATE IN ATMOSPHERIC PARTICULATE MATTER (2,4-XYLENOL METHOD (1)). *Health Lab. Sci., 7(4):267-269, Oct. 1970. 3 refs.*

A method is described for the analysis of nitrate in atmospheric particulate matter. Particulate matter is collected on a glass fiber filter. Nitrates are extracted with water, and 2,4-xylenol nitrated by the acidified extract is then extracted with toluene and finally reextracted from the toluene with solium hydroxide solution. The determination is made colorimetrically at 435 nm. The apparatus, reagents, and procedure are outlined, as well as the range and sensitivity, interferences, calibration, and standardization.

19733 APTIC NO. 38363

Sandscheper, Guenter

LASER DETECTS POLLUTANTS. *(Laser suchen Schadstoffe). Text in German. VDI (Ver. Deut. Ingr.) Nachr. (Berlin), 26(4):1,9, Jan. 1972.*

The first light detection and ranging (lidar) system in West Germany was installed in 1969 in Duisburg on a 60 m high building. The system monitors 150 stacks in a range of 9 km. The system is connected with a television camera. Date and hour of the day is printed into the picture taken of a stack. More than 30 polluters could be spotted who exceeded set limit values. The determination of the dust content in the smoke plume was not feasible, however, with the system. In the meantime a mobile lidar system has been developed which can be directed to points 10 km away with an accuracy of plus or minus 10 m. With the beginning of 1971, the spin-flip-Raman-laser was introduced in the U. S. with an infrared radiation between 5-6 micron and 9-16 micron, the unit can determine certain substances in waste gases. However, most of the major air pollutants cannot be analyzed with it. Detection and determination of the quantity of a pollutant will be feasible with the newly developed dye laser. Such lasers can be tuned to the absorption frequency of an atom or molecule and thus excite fluorescent light which can be measured.

19734 APTIC NO. 38278

Scholl, G. and H. Rudolph

AN EXPOSURE APPARATUS FOR HIGHER PLANTS FOR BIOLOGICAL INDICATION OF AIR POLLUTION. *(Ein Expositionsgefaess fuer hoehere Pflanzen zur biologischen Indikation von Luftverunreinigung). Text in German. Wasser Luft Betrieb, 16(3):96-97, March 1972. 6 refs.*

The exposure equipment for measuring fluorine emissions comprises a container resting on a pole. The container is made of plastics and is composed of a supporting container and a plant cultivation container. In the bottom of the outer supporting container, two borings provide for air circulation and water outflow. The container is screwed to the pole, an iron tube. The supporting container has a latex coating to reflect solar radiation. The plant cultivation container consists of a lower chamber holding about 3000 ml water for the water supply of the grass culture. The upper chamber holds the growth substrate and a ceramic cylinder for automatic irrigation. The two chambers are separated by a perforated palate. Excess water which collects in the substrate can pass through this plate into the water supply chamber, and from there to the supporting chamber where it runs off through the boring. The size and shape of the exposure set-up should not be too large so that a simple iron rod, which is driven 60 to 80 cm into the soil, is a sufficient support.

19735 APTIC NO. 38622

Sekikawa, Sachio, Hirokazu Naganawa, Hiroshi Murakami, Koichiro Ozawa, and Hitoshi Koike

AIR POLLUTION MONITORING SYSTEM UTILIZING MINI-COMPUTER. *N.E.C. Res. Develop., no. 24:32-47, Jan. 1972.*

An air pollution monitoring system that gathers data from a scanning telemetering system and processes the data using the NEAC-M4 mini-computer is reviewed with respect to system outline, hardware, software, and performance. The system is an on-line real-time data gathering system that measures sulfur oxides, dust density, carbon monoxide, nitrogen oxides, hydrocarbons, oxidants, air temperature, humidity, ultraviolet rays, visibility, traffic concentration, and wind direction and velocity at the sensor of the monitoring station. The data are converted to digital codes and are transmitted to the central station, where they are processed by the mini-computer; the output is then sent to a display board and typewriter. (Author abstract modified)

19736 APTIC NO. 37902

Sem, G. J., J. A. Borgos, and J. G. Olin

MONITORING PARTICULATE EMISSIONS. *Chem. Eng. Progr., 67(10):83-89, Oct. 1971. 30 refs.*

Measurement of the total mass flow of particulate emissions from smoke stacks on large combustion facilities is a major problem for stack owners, pollution control officials, and emissions control equipment manufacturers. Beta radiation attenuation is presently one of the two most promising techniques for automatically measuring effluent particulate mass concentration, primarily because it actually senses a particle parameter very closely related to mass. One measurement takes 1-15 min. The piezoelectric microbalance technique also detects particle mass directly, but is yet to be tested with coal or oil combustion effluent particles where the adherence of larger particles to the crystal and the cleaning and replacement of loaded crystals may be major problems. The technique has higher sensitivity, thus allowing for significantly faster measurement. Light transmission and light scattering techniques only measure optical density, but are simple, inexpensive, and easy to operate and maintain. Although several particle parameters, e.g., size, shape, and specific density, affect particle concentration measurement, light transmission and scattering instruments can be calibrated to give rough measurements of particulate mass emissions under given conditions. The basic principles, operating variables, and efficiencies of the techniques are examined. (Author summary modified)

19737 APTIC NO. 38581

Shigeta, Yoshihiro

MEASUREMENT OF ODOR AND ODOR CONTROL. *(Akushu no sokutei to sono taisaku). Text in Japanese. Preprint, Japan Petroleum Inst., Tokyo, p. 47-56, 1971. (Presented at the Lecture Meeting on Environmental Pollution Analysis and Auto Analysis, 13th, Tokyo, Japan, Nov. 10-12, 1971.)*

Various methods of measuring bad odors such as the odorless chamber method, the injection method, the Shuken-Kinoshita method, the gas chromatography method, the low temperature adsorption method, the vacuum jar method, and the solid reaction tube method are explained briefly. The basic investigation of bad odor includes the detection of the emission source, pinpointing of the specific treatment process, and measurement of the degree of odor intensity, quantity, composition, and concentration. Secondly, the extent of damages should be investigated as to the distance and angle in the leeway from the emission source. Thirdly, the degree of intensity and extent of the bad odor on the particular day of investigation must be compared with the other days by means of questionnaire. The local climatic characteristics must be investigated prior to questioning. The basic methods of controlling bad odor include the elimination or minimization of the heating process at the odor producing source; reduction of the amount of emission; equalization of the amount of emission; avoiding overloading of any process equipment; and the adjustment and redevelopment of a better work environment. Various deodorization methods such as combustion, oxidation by a catalyst, adsorption, ion exchange resins, ozone oxidation, acid-alkaline scrubbing, neutralization agents, coal adsorption, water scrubbing, and electrodes are briefly explained. The cost for constructing various types of deodorization apparatuses are reviewed by a table.

19738 APTIC NO 38696

Shiller, J. W.

DETECTION OF VERY SMALL CONCENTRATIONS OF SULFUR COMPOUNDS IN AMBIENT AIR. *Bendix Tech. J., 4(3):56-60, Winter 1971. 2 refs.*

The use of flame photometry for sulfur detection and techniques for improving the sensitivity and selectivity of the method are reviewed. The instrument is capable of measuring sulfur concentrations in ambient air down to levels of 10 ppb. Basic detector operation and calibration are considered. The utilization of a rotating interference filter as a spectrum scanning detector to improve efficiency is discussed. The techniques can be applied to the detection of emitting species other than sulfur, among them boron. Examples of emission spectra are presented.

19739 APTIC NO. 38058

Siano, Matteo and Guidi Guido Guidelli

METHOD AND APPARATUS FOR DETECTING THE PRESENCE OF DANGEROUS CONCENTRATIONS OF COMBUSTIBLE GASES OR VAPORS IN THE AIR. *(Assignee not given.) U. S. Pat. 3,553,461. 4p., Jan. 5, 1971. 5 refs. (Appl. Nov. 3, 1967, 8 claims).*

A method and apparatus are presented for the continuous detection of relative amounts of combustible gases and vapors in ambient air. The problem of the emission of a signal when the concentration of the gas or vapor attains a certain safety value is equivalent to solving the problem of rendering possible the continuous observation of the variations of the activation energy of the oxidation reactions of the mixture, prior to its ignition. Previous apparatus, which are usually influenced by the relative humidity of the ambient air, present considerably inconveniences and limitations. In the present apparatus, ambient air flows through a reaction chamber in contact with an oxidation catalyst, with a plurality of detecting means sensitive to the varying radiant energy emitted along the catalyst in the direction of flow of the ambient air. Photosensitive cells or other means are included for receiving and comparing these different detected values. (Author abstract modified)

19740 APTIC NO. 38020

Simon, A.

ELECTRON MICROSCOPIC STUDY OF THE SIZE DISTRIBUTION OF AEROSOL PARTICLES CAPTURED ON MEMBRANE FILTERS. *Idojaras (Budapest), 75(5/6):303-307, Sept./Dec. 1971. 9 refs. (Presented at the Hungarian Meteorological Society, Seminar on Atmospheric Chemistry, July 23, 1971.)*

Aerosol particles were captured on membrane filters which were prepared for electron microscope analysis by evaporation of a thin carbon film on the filter surface, shadowing at 45 and 180 deg angles using gold/palladium, and finally by dissolving cut filter pieces in acetone. By applying a correction factor for particles not captured by impaction around filter pores, particles as small as 0.01 micron radius were successfully evaluated. Size distributions obtained by this method for aerosols collected in suburban Budapest and in a background region were similar to those measured by optical microscopy. To avoid particle losses, future samplings will be made with a thermal precipitator.

19741 APTIC NO. 38449

Simons, Wilhelm

CALCULATION OF WASTE GAS FLOW FROM CUPOLA OVENS AS RELATED TO EMISSION MEASUREMENTS. *(Berechnung des Abgasstromes an Kupolofenanlagen im Zusammenhang mit Emissionsmessungen). Text in German. Tech. Ueberwach (Duesseldorf), 13(2):46-48, Feb. 1972. 3 refs.*

Since the amount of the waste gases produced by cupola ovens per unit of time cannot always be determined, calculations in which waste gas analysis, coke consumption, and melting capacity are taken into account are required. In the following calculation of the waste gas flow, the determination of the variations of the carbon monoxide amount is unnecessary. Waste gas amounts as calculated from the original and the modified equations, and measured, are compared. A method is given for the general calculation of the carbon monoxide content of the waste gas and of the waste gas flow from the carbon dioxide and oxygen content of the waste gases. The specific waste gas flows calculated from the original and the modified version have deviations in a range of -4.3 to +3.3, relative to the original equation. The deviations for the calculated values lie, though always negative, within the limits of error. The deviations for the measured values yield a mean around zero. A great number of CO2 and O2 determinations should be performed. The deviations of the measured waste gas amounts from the calculated values were in a range of -44% to +326%, with a mean value of +26.6%. Due to the difficulties in the measurements of the flow speed, the dust amounts should be determined from the calculated rather than from the measured values. The carbon monoxide content was between 0-5.5% in 119 cases where permanent or periodical throat gas afterburning was applied. The CO content was below 1.5% in 87% of all plants.

19742 APTIC NO. 37798

Solovieva, T. V., N. S. Evseenko, L. P. Serbina, and S. A. Fomina

METHODS OF DETERMINING INHIBITORS OF ATMOSPHERIC CORROSION IN THE AIR. *(Metody* *opredeleniya nekotorykh ingibitorov atmosfernoy korrozii v vozdukhe). Text in Russian. Gigiena i Sanit., 37(1):59-61, 1972.*

Methods for the determination of hexamethylene amine metanitrobenzoate, an oil-soluble salt of dicyclohexylamine, and dicyclohexylamine nitride were studied. The determination of hexamethylene amine metanitrobenzoate was found to be best with a reaction of n-dimethylaminobenzaldehyde following reduction by hydrogen. The optimum conditions for the hydrogen reduction and the reaction were determined. The spectrophotometric analysis revealed absorption maxima of 454-464 nanom. Stable coloration was obtained in a hydrochloric acid solution. The absorption from air was best in water and 0.01 n-hydrochloric acid. This substance mav be present in air primarily in the form of vapor (up to 85-90%). For the oil-soluble salt of dicyclohexylamine, the Barreto-Duncombe method in which sodium dimethyl dithiocarbamate is used to form salts with fatty acids, was best. To the chloroform solution, a solution of triethanolamine, acetic acid, and copper sulfate was added. The absorption maximum was 442 nanom. This substance is present in air primarily in aerosol. The sampling was made by a paper filter at flow rates of 8-10 l/min. The determination of dicyclohexylamine nitride was made by means of Griess-Ilosvay reagent, in exploiting the nitrite reaction. The absorption maximum was in a range of 512-520 nanom. The respective sensitivities for photometric and visual determination were 0.5 micrograms and 0.25 micrograms. This substance is present in air primarily in vapor (98-99%). The sampling was made at flow rates of 3-4 l/min.

19743 APTIC NO. 38463

taszeweski, R.

METHODS OF ANALYSIS OF SULPHUR COMPOUNDS IN HYDROCARBON MIXTURES: THE APPLICATION OF THE MOLECULAR SIEVE 13X TO THE DETERMINATION OF LOW CONCENTRATIONS OF SULPHUR COMPOUNDS. *J. Chromatog., 65(1):217-218, Feb. 9, 1972. 3 refs.*

Total sulfur and individual sulfur compounds in hydrocarbon mixtures were determined by passing liquid or gaseous samples through an adsorption tube containing the molecular sieve 13X and then using the molecular sieve as the intial sample as in the Granatelli method. Desorption of the adsorbed compounds was achieved by destruction of the crystal lattice of the molecular sieve with mineral acids. The procedure permitted the determination of total sulfur at concentrations below 0.1 ppm. The molecular sieve 13X also allows the determination of trace amounts of sulfur dioxide in air.

19744 APTIC NO. 37979

Strom, Lars

TRANSMISSION EFFICIENCY OF AEROSOL SAMPLING LINES. *Atmos. Environ., 6(2):133-142, Feb. 1972. 11 refs.*

For the measurement of the amount of particulate matter carried by a gas, it is often necessary to transmit a sample of the aerosol through a conduit, from the location of sampling to a measuring instrument. The deposition of aerosol particles in a conduit consisting of horizontal and vertical tubes and bends was measured to determine transmission efficiency. Monodisperse test aerosols were used, with particle diameter of 2-15 micron. The deposition showed a minimum at a Reynolds number of approximatelv 2800. At a lower Re, deposition in the horizontal tubes dominated; at a higher Re, deposition in the bends increased sharply. A charged aerosol deposited faster than a neutral aerosol. (Author abstract modified)

19745 APTIC NO. 38205

Takahashi, Hidechika, Sumiyoshi Kikuchi, and Nobuko Kobayashi

COMPARISON BETWEEN THE SAME KIND OF TWO MEASURING INSTRUMENTS FOR SULFUR DIOXIDE AND NITROGEN OXIDES. *(Aryusan gasu sokuteiki oyobi chisso sankabutsu sokuteiki no doitsu kishu ni okeru sogo no hikaku). Text in Japanese. Tokyo-to Eisei-kyoku Gakkai-shi (Rept. Tokyo Public Health Studies), no. 48:20-21, Nov. 1971.*

Measurements were carried out simultaneously with the same kind of instruments of the Itabashi-higashi Health Center and the Ouji Health Center for sulfur dioxide and nitrogen oxides under the same measuring conditions. The unit duration for measurement of sulfur dioxide was ten minutes but an average value/hr was adopted. The measuring period was 14:00 of May 26 through 12:00 of May 28, a total of 47 hr. Nitrogen oxides had a 1 hr value. The measuring period was 14:00, April 26 through 21:00, April 29 and amounted to 70. As a result, significant correlations with 1% risk was found between SO2 values obtained by the two methods. As for nitrogen dioxide and nitric oxide values, the same significant correlation with 1% risk was found.

19746 APTIC NO. 38644

Tamori, Ikuo

ON THE PROBLEM IN MEASUREMENT OF DUST CONCENTRATION IN WET FLUE GAS. *(Shimeri haigasu chu no baijin nodo sokutei ni okeru mondaiten to sono kangaekata). Text in Japanese. Funtai Kogaku Kenkyu Kaishi (J. Res. Assoc. Powder Technol., Japan), 9(1):33-36, Feb. 1972. 3 refs.*

With revision of the Enforcement Regulations, Air Pollution Prevention Law, effective June 1971, the criteria for dust emissions have become more strict, lowering the allowable limit value to 1/3-1/10 of the previous value. With such stringent control criteria enforced, the cry for reexamination of the present dust measurement methods legally stipulated has been raised by many quarters concerned. The method set up to measure the dust concentration in wet flue gas has been criticized, in that the present method based on dry base gives a much higher value than the actual when applied to flue gas treated by a wet type dust removal process because of the high moisture percentage. From this viewpoint, the existing measuring methods for dust concentration in flue gas stipulated in JIS Z8808 are briefly discussed while giving an example of why the dust concentration of wet flue gas obtained by the JIS methods often fails to represent the actual dust concentration. A few approaches suggested for solution of this problem are introduced, although none of them seems to offer a complete solution to the problem. One is a method in which the dust concentration value obtained by the conventional measuring method is corrected for water content. Also, the dust concentration can be represented as it is in flue gas whether the gas is wet or not. The dust concentration can be represented in the condition where the flue gas diffuses in the atmosphere. As for the sampling methods, the dust tube sampling and cylindrical paper filter methods were recommended.

19747 APTIC NO. 38212

Terabe, Motoji

MEASUREMENT OF ATMOSPHERIC POLLUTION AND ITS PROBLEMS. *(Taiki osen sokuteiho to sono mondaiten). Text in Japanese. Preprint, Japan Petroleum Inst., Tokyo, p. 1-18, 1971. 21 refs. (Presented at the Lecture Meeting on Environmental Pollution Analysis and Auto Analysis, 13th, Tokyo, Japan, Nov. 10-12, 1971.)*

The environmental standards of the United States and Japan, including those for sulfur dioxide, suspended particulates, carbon monoxide, oxidant, hydrocarbons, nitrogen dioxide, are critically compared. Various equipment and methods for measuring suspended particulates such as the high volume sampler, glass fiber filter, colorimetry, photometry, tape sampler, and digital dust meter are explained with illustrations. The method of preparing a standard gas by a permeation tube is explained. Various methods and results of nitrogen oxides measurements are reviewed by a table. Some of the problems in measuring sulfur dioxide are the discrepancies created by the use of different methods or equipment. For instance, the results from using an air pollution meter (electroconductivity) are generally much higher than those obtained by using the Rosanilin method (West-Gaeke method). Various published theories with regard to the causes and the correction methods of discrepancies are discussed. The problem in using the lead dioxide method is created by the activity of Pb02 and the shapes and ventilation of various kinds of shelters. Considerable differences are noted in the results obtained by the six known types of shelters. The standardization of the method and equipment is strongly desired.

19748 APTIC NO. 38447

Thiele, B. R.

AUTOMATED INSTRUMENTS IN AIR POLLUTION MONITORING SYSTEMS. *Clean Air, 5(4):65-70, Nov. 1971. 10 refs. (Presented at the Technicon International Symposium, Sydney, Australia, Feb. 7, 1971.*

There are several unique patterns of air pollution, depending on the geography, meteorology, and industry of an area. Thus, locally significant pollutants and meteorological parameters must be established before an air pollution survey is undertaken. The most commonly monitored pollutants are fallout (dust fall), suspended particulates, sulfur dioxide, carbon monoxide, oxidants, nitrogen oxides, and hydrocarbons. Colorimetric techniques for the analysis of the gaseous pollutants can be successfully automated to permit continuous monitoring. If the air pollution pattern of a city is to be studied in detail, at least one fully automated, continuous monitoring station is indicated. If pollutant sources are to be monitored, then continuous automated instruments become even more necessary. The requirements of a suitable monitoring instrument are given and some newer instruments are described. Included are flame ionization detectors, flame photometric detectors, and conductimetric instruments. Future instruments may be based on microwave absorbance spectrometry and laser spectrometry.

19749 APTIC NO. 38096

Todorava, Ya.

MICROQUANTITATIVE DETERMINATION OF ACETYLENE IN AIR BY MEANS OF IMPREGNATED CHROMATOGRAPHIC PAPER. *(Mikrokolichestvennoye opredeleniye atsetilena v vozdukhe s pomoshch yu impregnirovannoy khromatograficheskoy bumagi). Text in Russian. Zh. Analit. Khim. (Moscow), 26(9):1811-1813, 1971. 7 refs.*

A method for determining the trace amounts of acetylene in air is based on the formation of copper acetylenide, which is then separated and dissolved in dilute nitric acid. The copper concentration is proportional to the C2H2 concentration and is detected by means of chromatographic paper impregnated with (MoO2)2Fe(CN)4 molybdenum dioxide-iron-cyanide. Copper(2-) ions migrate over the impregnated paper, react with (MoO2)2Fe(CN)4, and form Cu2Fe(CN)4. The method permits the determination of acetylene in air with an accuracy of 1.3%. One determination takes 40 min.

19750 APTIC NO. 37803

Tovshteyn, I. V.

DETERMINATION OF TOLUENE AND XYLENE IN THE AIR. *(K voprosu ob opredelenii toluola i ksilola v vozdukhe). Text in Russian. Gigiena i Sanit., 36(8):99-100, Oct. 1971.*

In the Yanovskiy colorimetric method (addition of base to the nitrated substances simultaneously, and colorimetric determination after 5-10 and 15 min for toluene and xylene, respectively), coloration shifts and precipitants were observed at the end of the determination. To avoid such deficiencies, investigations were carried out to determine the optimum time at which the reaction products have maximum stability. Toluene, xylene, and their mixture were nitrated under identical conditions, and a 5% solution of sodium hydroxide was added. The optic density was read seven times at 3-minute intervals, using a neutral filter. Distilled water was used as the compensating liquid. Increases of 16-20% in optic density were observed 21 min after the base was added to the samples, while hardly any changes were found during the first 3-6 min. It proved to be possible not to add the base simultaneously to all samples and standards, and to read each tube 3 min after the addition. Both stable coloration and the absence of precipitants were found, and reproducible values were obtained.

19751 APTIC NO. 38067

Traver, Alfred E.

HYDROCARBON EMISSIONS COMPUTER. *(Mobil Oil Corp., New York) U. S. Pat. 3,630,072. 9p., Dec. 28, 1971. 4 refs. (Appl. April 30, 1970, 9 claims).*

A method is presented for testing a vehicle for hydrocarbon emissions which comprises sequentially operating the vehicle through a plurality of modes including acceleration, deceleration, and cruise. A signal representative of the hydrocarbon count for one of the modes is generated and stored on a capacitor. The capacitor charge is changed from the stored value to a predetermined value, and the rate of change is adjusted by a predetermined mode factor. A function representative of the amount of time to change the capacitor to the predetermined value is generated, and the hydrocarbon count as modified by the predetermined mode factor is displayed in response to the generated time function. The steps from generating a signal through generating the time function are repeated for each of the remaining modes, and the displayed representation is adjusted in response to each generated time function to arithmetically add all hydrocarbon counts as modified by their respective mode factors.

19752 APTIC NO. 38060

Uhdeova, J. and J. Janak

A STUDY OF THE DESULPHURIZATION OF ORGANIC SULPHUR COMPOUNDS ON RANEY NICKEL BY MEANS OF REACTION GAS CHROMATOGRAPHY. *J. Chromatog., 65(1):179-196, Feb. 9, 1972. 32 refs.*

The desulfurization of organic sulfur compounds on RaNi, carried out in reaction gas chromatography, as a method for the qualitative and quantitative analysis of liquid and solid sulfur compounds in either the pure state or dissolved in suitable indifferent solvents was studied. The courses of the reactions of sulfur compounds on a Raney nickel containing 0-5% w/w of sulfur are computed. Experimental procedures, evaluation data, characterization of the desulfurization packing, and the effects of temperature, hydrogen flow rate, degree of conversion, sulfur content of the RaNi, and nickel aging were examined. The analyzed compounds were mercaptans, sulfides, and cyclic sulfides. The technique was used successfully for the determination of trace amounts of diphenyl sulfide in the hydrocarbons, with the relative error at 3%. The same technique can also be used in the quantitative analysis of trace amounts of sulfur compounds in the atmosphere.

19753 APTIC NO. 38475

Vitek, Jan, Ferdinand Glac, Eva Rihakova, and Vaclav Skoda

A NEW SPECIALLY SHAPED FILTER FOR THE MEASUREMENT OF DUST CONCENTRATIONS. *(Ein neues, besonders geformtes Messfilter zur Bestimmung der Staubkonzentration). Text in German. Staub, Reinhaltung Luft, 31(12):501-502, Dec. 1971. 8 refs.*

A newly developed filter for dust measurements consists of a filter material made of organic micro-fibers on the basis of polyvinylchloride. The material has a high collection efficiency for dust particles with sizes of more than 0.1 micron, and a relatively low aerodynamic resistance. It is extremely hydrophobic. The filter is of conical shape. Practical experience with the filter has shown that the collection efficiency for particles of the fly ash is more than 99.5% by weight, for particles of the respirable fraction of coal dust more than 99%. Tests with artificially produced quartz dust revealed that the filter retained more than 99% of the total number of particles. The quartz dust contained 7.7% by weight of particles in the size range up to 0.5 micron, 34.3% particles with diameters between 0.5 to 1 micron, 57.5% of particles with diameters from 1 to 5 micron, and only 0.5% particles with more than 5 0micron. The filter has a good mechanical resistance and negligible wear. The filter material can be entirely dissolved in ethylacetate.

19754 APTIC NO. 38309

Wiseman, William Antony

CONTINUOUS DETECTION METHOD AND APPARATUS. *(Assignee not given.) U. S. Pat. 3,627,467. 4p., Dec. 14, 1971. 8 refs. (Appl. Jan. 31, 1969, 13 claims).*

The method and apparatus for the continuous measurement of a component of a continuously flowing gas stream, adapted from the reaction coulometer, are presented. The procedure involves adding a reactive gas to the stream to react with the component, detecting the level of reactive gas formed after the reaction, and generating further compensatory reactive gas in an electrolytic cell for addition to the gas stream. The current flowing in the cell is an accurate measure of gas consumption and of the component to be measured. The method is improved by operating the reaction intermittently and averaging or integrating the current during periods of reaction and nonreaction. If there is any combustible material in the carrier gas, these two integrals will be different and the difference will be a quantified measure of the concentration of the component. (Author abstract modified)

19755 APTIC NO. 38405

Yoe, John H.

A PROPOSED OUTLINE FOR INVESTIGATING AND DEVELOPING A NEW COLORIMETRIC METHOD EMPLOYING AN ORGANIC REAGENT. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 210 - 221. 10 refs. (May 3-5, Louis C. McCabe, ed.)*

The steps in developing a new colorimetric reaction are discussed; the first is selection of a suitable solvent for the organic reagent being used, followed by determination of the solubility and stability of the reagent. For the color reaction itself, aspects to be investigated are the effect of hydrogen-ion concentration, sensitivity of the color reaction and the optimum concentration range, rate of color formation, stability, composition, and structure of the colored compound, and effects of various ions. Conformity to Beer s law should be tested for each new reagent. The use of color filters and photoelectric colorimeters and spectrophotometers may be advisable. Finally, accuracy and precision must be established. Colorimetric determinations using organic reagents are described for palladium (e.g., p-nitrosodiphenylamine), iron and titanium (disodium-1,2-dihydroxybenzene-3,5-disulfonate), and silver (2-thio-5-keto-4-carbethoxy-1,3-dihydropyrimidine).

AIR QUALITY MEASUREMENTS

19756 APTIC NO. 37994

Yamaguchi Prefecture (Japan), Research Inst. of Health; Yamaguchi Prefecture (Japan), Section of Environmental Hygiene; Yamaguchi Prefecture (Japan), Section of Public Nuisance; and Kuga Health Center (Japan)

RESULT OF AIR POLLUTION RESEARCH AROUND B TREATMENT AND DISPOSAL PLANT FOR INDUSTRIAL WASTES. *(B sangyohaikibutsu shorijo shuhen no taiki osen chosa seiseki ni tsuite). Text in Japanese. Yamaguchi-ken Eisei Kenkyusho Nenpo (Ann. Rept. Yamaguchi Prefect. Res. Inst. Health, vol. 13:78-79, 1971.*

The industrial wastes of the B treatment and disposal plant of Kumate-cho consist of the last disposal substances from an oil refinery, an oil chemical factory, and other chemical factories. The research was carried out at four spots of the area on the 11th and 12th of Dec. 1970. A sequential air sampler was used to measure sulfur dioxide every hour. Nitric oxide, nitrogen dioxide, ammonia, and chlorine were measured every two hours, and fluorine and SO2 were measured every three hours. The SO2 concentrations averaged 71.6 ppm at the outlet of chimneys, and 2.06 ppm at the outlet of a gas and vapor separator. Most SO2 was exhausted from the chimney (averaged 0.005-0.006 ppm) (the highest concentration being 0.029 ppm) at the spot 40-100 m distant from the incinerator. Among nitrogen oxides concentrations, NO averaged 0.032-0.019 ppm, and NO2 was 0.033-0.031 ppm. As for NH3, Cl, F, and sulfate, 0.005 ppm of chlorine was determined and others were not found.

19757 APTIC NO. 38105

Yamaguchi Prefecture (Japan), Research Inst. of Health and Yamaguchi Prefecture (Japan), Section of Public Health

RESULT OF ESTIMATION OF AIR POLLUTION IN TOKUYAMA, SHIN-NANYO, AND KUDAMATSU DISTRICT OF YAMAGUCHI PREFECTURE. PART 3. *(Tokuyama, Shin-nanyo, Kudamatsu chiku ni okeru taiki osen chosa seiseki ni tsuite. (Dai 3 po)). Text in Japanese. Yamaguchi-ken Eisei Kenkyusho Nenpo (Ann. Rept. Yamaguchi Prefect. Res. Inst. of Health), vol. 13:66-69, 1971.*

Estimations of sulfur dioxide, nitrogen oxides, and suspended particulate matter in Shin-nanyo, Tokuyama, and Kudamatsu in Yamaguchi Prefecture were carried out during Aug. 26 and Sept. 1, 1970. Sulfur dioxide and nitrogen oxides (nitric oxide and nitrogen dioxide) collected by sequential air sampler were analyzed by the pararozanilin method and the N(1-naphtyl)ethylene diamine method. The maximum value of sulfur dioxide and the wind direction was observed in each area, that is: 0.036 ppm and west-southwest in Tokuyama, 0.035 ppm and east-southeast in Shin-nanyo, and 0.018 ppm and south in Kudamatsu. The relation between the maximum value of nitrogen oxides and the wind direction was not observed clearly, but the concentration of nitrogen oxides was affected by the traffic volume. In Tokuyama and Shin-nanyo, where the national road crossed the center of the cities, the concentration of nitrogen oxides was about twice that of Kudamatsu. Sulfates, nitrates, chlorides, pH, organic matter, and total amount of dust were analyzed from suspended particulate matter collected by a hi-vol air sampler. The average value of the maximum amount of dust of these areas was 269 micrograms/cu m, which was recorded when the measuring point was on the leeward of factories. The concentrations of sulfates and organic matter were not different in these areas, but nitrates were higher at Tokuyama and Shin-nanyo than Kudamatsu. Correlation was found between the concentration of SO2 and suspended particulate matter.

19758 APTIC NO. 38110

Hiroshima Prefecture (Japan)

WHITE PAPER OF ENVIRONMENTAL POLLUTIONS IN HIROSHIMA PREFECTURE, 1970. *(Hiroshima-ken kogai hakusho showa 46 nendo ban). Text in Japanese. 212p., July 1971.*

Actual status and control measures of environmental pollution in Hiroshima Prefecture were discussed. Environmental hazards occurred chiefly at the littoral industrial district of the Inland Sea, such as the Otake district (petroleum complexes), Kure district (iron and steel, shipbuilding, machine, and pulp industries), Fukuyama district (iron and steel industries and electric power industries) and the center of Hiroshima City. Air pollutants were sulfur oxides, suspended particulate matter, and automobile exhaust gases. The average value of sulfur oxides for three years from 1968 decreased in the Otake district but increased in Kure and Fukuyama districts. The average amount of dust fall in Kure City was 12.39 t/sq m and 10t/k sq m in other districts and suspended dust was 375.08 micrograms/cu m in Hiroshima City. Environmental pollution by lead had spread as pollution by automobile exhaust gases. The average value obtained at all the measuring points was 2.030 micrograms/cu m. Carbon monoxide, nitrogen oxides, and hydrocarbons tended to increase, but photochemical smog has not yet occurred. Water pollution spread mainly at the Inland Sea of Japan. Fish perished at the Bay of Hiroshima. Nosie, vibration, and offensive odor also caused troubles, mainly at industrial districts. As a countermeasure, pollution control regulations were issued from April 1970. A telemeter system was newly provided and continuous monitoring has been carried out by the Department of Public Health of cities, the Laboratory for Environmental Pollution of the Hygienic Institute, and the Head Office and Council for Pollution Control.

19759 APTIC NO. 38202

Sapporo Municipal Government (Japan), Dept. of Public Health

ACTUAL CONDITION AND COUNTERMEASURE OF ENVIRONMENTAL HAZARD IN SAPPORO CITY. *(Sapporo-shi no kogai no genkyo to taisaku). Text in Japanese. 68p., July 1971.*

Air pollution, noise, vibration, water pollution, offensive odor, and environmental hazards due to stone-quarrying plants in the Sapporo municipality are discussed. Air pollution in Sapporo is mainly caused by heating in winter. Coal was recently replaced with oil, and the amount of dust fall as pollutant has shown no marked fluctuation. But the amount of sulfer oxides has increased. Especially at the center of city, where large scale equipment for heating is crowded close together, the monthly average of sulfer oxides for the 5 mo during winter is over the standard value; it is 0.067 ppm. Pollution by automobile exhaust gases has not offered any problem. Odors caused by slaughtering, meat producing plants, and the chemical industry are pointed out.

19760 APTIC NO. 38227

Saitama Prefectural Government (Japan), Dept. of Public Welfare

SAITAMA PREFECTURE, DEPARTMENT OF PREFECTURAL PEOPLES LIFE. ON PHOTOCHEMICAL SMOG. *(Kokagaku sumogu ni tsuite). Text in Japanese. 35p., Sept. 1970.*

An estimation of oxidant concentration was carried out by the Kawaguchi Health Center, Saitama Prefecture, in Aug. and Sept. 1970; the results of estimations in August were compared with those carried out in Tokyo in the same month. The neutral potassium iodide method ($2KI + H_2O + O_3$ yields $2KOH + I_2 + O_2$) was employed. The oxidant concentration abruptly increased from noon, and reached a peak during 1:00 and 2:00 pm. Highly concentrated oxidants occurred in fine weather, high temperature (33 C), and comparatively low humidity. Poor visibility in Ogasawara was accompanied by high pressure; the air was stabilized (S-SE wind less than 4 m; NNE-E less than 2 m). The concentration of oxidant of Kawaguchi Health Center was lower than that of Metropolitan Hygienic Research Institute, higher than that of Metropolitan Joto Health Center, and almost the same as that of Metropolitan Public Hazards Research Institute and Setagaya Ward Office. High concentration in both Tokyo (0.18 ppm) and Saitama Prefecture (0.19 ppm) existed on the 6th of August, and warnings against photochemical smog were officially announced. At Kawaguchi Health Center, a concentration over 0.1 ppm occurred on eight days; sulfur oxides also showed a high concentration (0.11 0.23 ppm). The damage in Tokyo and Saitama, the occurrence mechanism of photochemical smog, the effect of photochemical oxidant, and problems in warning systems against air pollution and their countermeasures in Los Angeles are also discussed.

19761 APTIC NO. 38290

Japan Society of Mechanical Engineering, Tokyo

A STUDY ON AIR POLLUTION BY AUTOMOBILE EXHAUST GASES. *(Jidosha haishutsu gasu ni yoru taikiosen ni kansuru kenkyu). Text in Japanese. 238p., May 1971.*

The availability of the APPS (Air Pollution Prediction System) was discussed as a comprehensive analytical method of air pollution which considers such factors as traffic conditions, street planning, meteorological conditions, and industrial sources of pollution. By means of equations of air diffusion, APPS is applicable to the numerical estimation of air pollution. APPS consists of a Traffic Model (TM), an Emission Model (EM), a Road Diffusion Model (RDM), a Local Diffusion Model (LDM), and an Areal Diffusion Model (ADM); it is possible to use each model separately or together. In the case of photochemical smog, it is possible to introduce presumed chemical reaction formule. Separate calculations of individual pollutants are available in the case of pollution caused by several pollution sources. Applicable methods of the abovementioned models using this calculating system are stated concerning the estimation of regional pollution near road intersections and of pollution in vast areas throughout a city. The results of calculations and actual measurements in Osaka City were compared. Examples of the calculation of pollution by photochemical reactions, carbon monoxide, and sulfur dioxide were shown. The value based on LDM of APPS agreed with 70% of the actually measured value. Although the comparison between actually measured value and RDM was not carried out. this calculation is considered to be practicable. As for pollution in vast areas, it is applicable to such areas as Tokyo Metropolis. A possible explanation of photochemical smog was also obtained by APPS-ADM taking account of photochemical changes.

19762 APTIC NO. 38334

Nagoya Municipal Office (Japan)

CONDITION OF POLLUTION BY SULFUR OXIDES DERIVED FROM BASIC INVESTIGATION FOR THE PLAN OF CONTROLLING ENVIRONMENTAL POLLUTIONS IN NAGOYA DISTRICT. *(Nagoya chiiki kogai boshikeikaku sakutei kiso chosa ni okeru iousankabutsu no osen jokyo ni tsuite). Text in Japanese. 15p., 1970 (?).*

Contamination by sulfur oxides was estimated by the PbO_2 method at Nagoya, Tokai, Obu, and Chita Cities, Akui-, Higashiura-, Kanie and Yatomi- towns, and Toshiyama and Tobishima villages during Dec. 1970 and Feb. 1971. The total number of measuring places was 292, of which 176 belonged to Nagoya City. The average concentration for three months was shown in the table under the different place of measurement. A line map of equal concentrations in winter, summer, and autumn was drawn. As a general rule, seasonal wind affected air pollution during the winter, and the effect of heating of buildings was seen in a limited area. For these reasons, a strip of a polluted area was seen at southern district in pollution map. The equal concentration district of 2.0 mg was expanded in a vast region and was recognized in four districts. Furthermore, polluted districts over 3.0 mg were found at Minato and Minami wards of Nagoya City and Tokai City. Concentrations during the winter were slightly higher than during summer and autumn. At a part of Minato ward in Nagoya city, a slightly higher pollution was found during summer, autumn, and winter; at a part of Tokai City higher pollution was also seen in autumn and winter, which was the effect of large scale industrial districts.

19763 APTIC NO. 38348

Saitama Prefectural Government (Japan), Dept. of Public Welfare

REPORT OF INVESTIGATION ON AIR POLLUTION ESPECIALLY ON SULFUR OXIDES AND AIR-BORNE DUST. *(Taikiosen chosa hokokusho iousankabutsu fuyubaijin o chushin toshite). Text in Japanese. 444p., March 1970.*

Results of estimations in Saitama Prefecture of sulfur oxides, soot and dust fall, and wind speed and direction since 1969 are stated; examination of sulfur oxides estimated since 1967 by the lead dioxide method and soot and dust fall estimated since 1963 are compared. Sulfur oxides have tended to decrease slightly every year since 1967. For the 1969 fiscal year, sulfur oxides were 0.7-0.78 S03 mg/100 sq cm/day in Kawaguchi city in the southern part of the prefecture; 0.42-0.65 S03 mg/100 sq cm/day in Kumagai city in the northern part of the prefecture; and 0.5 S03 mg/100 sq cm/day in other areas which was less than one-half of that in the southern area of the prefecture. In the southern areas, the concentration became high when the high atmospheric pressure on the southern ocean overlay Japan proper, the weather was clear, and the temperature was high in summer; and in winter, when it was rather warm during the day, especially between 14:00 and 18:00, due to the continental high atmospheric pressure which overlay Japan. The amount of soot and dust fall were about the same every year since 1963. In 1969, in the southern part of the prefecture, it was about 14-15.3 t/sq km/month; and in the northern part, it was less than 10 t/sq km/month. In industrial areas or neighboring areas like Kawaguchi Municipal Office or Kawaguchi Health Center, the concentration was almost the same in the morning and afternoon; and in residential or commercial areas like Hatogaya Municipal Office, Warabi Municipal Office, or Tokorozawa Health Center, the concentration was markedly high in the afternoon.

19764 APTIC NO. 38380

Kyoto Prefectural Government (Japan), Dept. of Hygiene

ACTUAL CONDITION AND COUNTERMEASURE OF ENVIRONMENTAL POLLUTIONS IN KYOTO PREFECTURE. *(Kyoto-fu ni okeru kogai no genkyo to taisaku). Text in Japanese. 103p., Sept. 1971. 10 refs.*

Actual condition, complaints, and control of environmental pollutions such as air, water, and noise pollution in Kyoto Prefecture were stated. Water pollution occurred in the northern part and various kinds of pollution which were characteristic of a big city arose in the southern part of Kyoto Prefecture, which is geographically divided into northern and southern parts by a centra mountainous district. Concerning air pollution, sulfur oxides due to heavy oil and carbon monoxide from automobile exhaust gases are the major problems, but the level of pollution has not shown any fluctuation. In Kyoto City, surrounded by mountains on three sides, inversions often occur, the annual rate of the days with the average concentration of sulfur oxides was high during November through March and low in August and September. Concentrations were highest during 8:00-12:00 am. Concentrations of carbon monoxide were generally higher at the center of city and at a national road. The amount of dust fall was about 7 tons/mo. Notices or warnings were given 28 times in the city in the winter of 1970, which was a significant increase over the previous year. As a countermeasure for environmental pollution in 1970, a regulation for pollution control was issued, enlarging the administrative organization for monitoring and the observation system. Controls by regulation and conducement for middle or small size enterprizes were carried out to prevent pollution. Telemeters for monitoring air pollution started to operate in June, 1970. Various statistical data, figures, and tables were added for reference at the end of the volume.

19765 APTIC NO. 38454

Japan Environmental Agency, Bureau of Air Quality

SUMMARY OF MEASUREMENT RESULTS BY NATIONAL AIR POLLUTION SURVEY NETWORK (NASN) IN 1969. *(Showa 44 nendo. Kokusetsu taiki osen sokuteimo (NASN) sokutei kekka no gaiyo). Text in Japanese. 30p., July 1971.*

A summary report of measurement results was presented in order to determine the successive changes of the quantity and quality of air pollution from April 1969 to March 1970. The measurements were taken at nine spots in the whole country: Tokyo, Osaka, Amgasaki, Kawasaki, Kitakyushu, Ube, Sapporo, Kurashiki, and Nagoya The measurements were of sulfur oxides, suspended dusts, nitrogen oxides (nitrogen dioxide and nitric oxide), direction and velocity of the wind, temperature, and humidity. They were continuously measured by an automatic measuring apparatus for 24 hr at all the spots. Samples were collected by a high volume air sampler for 24 hr twice a month in order to measure the quantities of suspended dusts and these components. Carbon monoxide, hydrocarbons, and oxidants were also measured in Tokyo and Osaka. Pollution by sulfur oxides was most severely seen in Kawasaki, and next severely in Amagasaki and Osaka. Pollution during the winter was obviously seen in Osaka. In Kawasaki, pollution obviously occurred during summer. The quantity of nitrogen oxides was equal to the extent of sulfur oxides in the major cities. These quantities were apt to increase in Amagasaki and Tokyo. Suspended dusts, as well as sulfur oxides, were mainly monitored and measured. All the amounts of dust increased in Kawasaki and remained on the same level in other cities. Sulfates in water soluble substances increased in six measuring spots (Sapporo, Tokyo, Kawasaki, Amagasaki, Osaka, and Kitakyushu). The quantities of carbon monoxide, hydrocarbon, and oxidant were higher in Tokyo than in Osaka.

19766 APTIC NO. 38524

Sapporo City (Japan), Public Health and Hygiene Section

REPORT OF SURVEY OF AIR POLLUTION IN SAPPORO CITY. (FROM APRIL 1969 TO MARCH 1970). *(Showa 44 nendo. Sapporo-shi no taiki osen sokutei kekka hokoku. (Showa 44 nen 4 gatsu - showa 45 nen 3 gatsu)). Text in Japanese. 343p., Feb. 1971 (?).*

The annual estimation of air pollution was performed during 1969 in Sapporo City. Soot and dust fall was measured at 14 spots, sulfur oxides were estimated by means of lead dioxide at 25 spots, sulfur oxides were recorded automatically at five spots, and concentrations of automobile exhausts were measured. The results of observations at the meteorological observatory are reported. Each amount of dissolved and undissolved matter was reported by month and by spot. The amounts of sulfur oxides were mentioned by month and by spot. For sulfur oxides estimated automatically, daily amounts were shown by measuring spot and the maximum and minimum values by hour. The estimation of automobile exhaust gases was performed twice, in summer (in Aug. 1969) and in winter (in Jan. 1970). Their concentrations were shown with the number of automobiles and the results of meteorological observation by hour. Concerning meteorological observations the velocity of wind, temperature, and humidity were shown.

19767 APTIC NO. 38554

Tokyo Metropolitan Public Nuisance Research Inst. (Japan)

RESULT OF ESTIMATION OF AIR POLLUTION MADE BY AUTOMATIC RECORDER. *(Taikiosen jidokirokukei sokutei kekka hokoku). Text in Japanese. 535p., Oct. 1970.*

The results of a standing survey for air pollution made during the latter half of 1969 are indicated by time, day, and month at each sampling point. Each sampling point was 5-10 m in height, and sampling time was 30 min past an hour to 30 min past the next hour; the direction and speed of wind are indicated by an average value of what were estimated for 10 min from 10 min to each hour. Also, the average nature of contamination, the high concentration of sulfur dioxide, and the statistic numerical table of list of proper environmental standards of each sampling point in each month during the period from 1962 to 1969 are indicated. The table of results gives the concentration of SO2, particulates nitric oxide, nitrogen dioxide, carbon monoxide, oxidants, hydrocarbons, direction and speed of wind, temperature, and humidity.

19768 APTIC NO. 38563

California Air Resources Board

CALIFORNIA AIR QUALITY DATA FOR JUNE, JULY AND AUGUST 1970. *Calif. Air Qual. Data, 2(4):1-29, June 1970.*

Tables are compiled of air quality data recorded at California air monitoring stations in June, July, and August 1970. The contaminants usually measured are oxidants, carbon monoxide, sulfur dioxide, nitric oxide, nitrogen dioxide, total nitrogen oxides, and total hydrocarbons. The information reported in the tables consists of the maximum hourly average concentration for each day, the highest of these values for the month, the monthly average of these values, and the peak concentration reached during the month. Tables presenting values for the daily average and highest reported reading for particulate matter are included. Also shown are tables defining values equalling or exceeding the state ambient air quality standards for oxidant, carbon monoxide, and nitrogen dioxide.

19769 APTIC NO. 38649

Osaka Prefectural Government (Japan)

ON ATMOSPHERIC CONCENTRATION OF SULFUR OXIDES IN FY 1971 (APRIL THROUGH DECEMBER 1971), AS MEASURED BY CONDUCTOMETRIC METHOD. *(Showa 46-nendo (4-12 gastsu) ni okeru iwo sankabutsu nodo (dendoho) no sokutei kekka ni tsuite). Text in Japanese. Preprint, 8p., Feb. 8, 1972.*

The sulfur oxides concentration in the atmosphere sampled at 20 measuring points in Osaka Prefecture during the first 9 mo of fiscal year 1971 is briefly analyzed and compared with the values obtained for the corresponding period of the preceding FY. The results obtained still indicate high SO values for the Osaka municipal area (six measuring points), as well as for the adjoining cities, Toyonaka and Moriguchi, the average value being about 0.05 ppm-0.06 ppm/hr. In the western part of Higashi Osaka City, bordering on the eastern part of the Osaka municipal area it was 0.035-0.04 ppm. However, it was 0.05 ppm for the eastern part of Higashi Osaka City located close to the foot of Mt. Ikoma. About 0.03-0.035 ppm or a comparatively lower value was recorded for Sakai City. Compared with the previous year (15 measuring points), almost all the measuring points indicated lower values. In particular, the Suita Health Center which had an average value of 0.080 ppm last year showed 0.055 ppm this year, while the value decreased from 0.076 ppm to 0.057 ppm at the Yodonaka Middle School and from 0.054 ppm to 0.034 ppm at the Shorinji Primary School of Sakai City. Fuel consumption during FY 1971 was estimated as a key factor for the emission of sulfur dioxide. Heavy oil consumption for FY 1971 was estimated at about 8.5 million kl, compared with 7.8 million kl for FY 1970. The SO2 emitted was estimated at 250,000 tons for FY 1971, or a considerable decrease from FY 1970 when it was about 295,000 tons. This resulted from the Blue Sky Campaign being run by Osaka Prefecture under which the use of low-sulfur fuel by all enterprises is strongly encouraged.

19770 APTIC NO. 38000

Blifford, Irving H., Jr. and Dale A. Gillette

APPLICATIONS OF THE LOGNORMAL FREQUENCY DISTRIBUTION TO THE CHEMICAL COMPOSITION AND SIZE DISTRIBUTION OF NATURALLY OCCURRING ATMOSPHERIC AEROSOLS. *Water, Air, Soil Pollut., 1(1):106-114, Nov. 1971. 20 refs.*

A total of 329 size distributions, obtained from measurements of atmospheric aerosols collected at altitudes of 0-9 km, was tested for lognormality using the modified Kolmogoroff-Smirnov test. The aerosols were collected at Scottsbluff, Nebraska; Death Valley, California; and over the Pacific Ocean about 250 km west of Santa Barbara, California. When considered as volume density distributions, 98% of those tested were lognormal at the 5% confidence level. Below 1 micron lognormality appeared to be less likely at high or low altitudes. The distribution of the elements chlorine, sulfur, potassium, calcium, silicon, and titanium in clean air aerosols was also lognormal. Calculations which compared the coagulation rate of a size distribution of fixed functional form with that of a mean of size distributions formed by coagulation of aerosols contained in small volumes, each having a particle distribution in which the number of particles in each size class was lognormally distributed about the mean, showed a probably insignificant difference. These results suggest that the global aerosol can be described by three overlapping lognormal distributions which have means in the submicron range; in the Mie scattering range; and in the large particle range. (Author abstract modified)

19771 APTIC NO. 38480

Bredel, H. and Ch. Stamm

STATISTICAL EVALUATION OF SO2 EMISSION MEASUREMENT IN THE CITY OF LEIPZIG. *(Statistische Auswertung von SO2-Immissionsmessungen im Stadtgebiet von Leipzig). Text in German. Z. Ges. Hyg. Ihre Grenzgebiete (Berlin), 17(12):882-886, Dec. 1971. 9 refs.*

In the city of Leipzig, sulfur dioxide short-term emission measurements were taken at 42 uniformly distributed measuring points over the period Nov. 1969 to Oct. 1970. From 7 am to 4 pm, 14 measurements were taken. From the 1070 individual measurements, the typical distribution form of the measured data was obtained. It corresponded approximately to a Poisson distribution. In the heating period (Oct. 15 to April 15) 35% and in the warm season 2% of all measured values exceeded the maximum allowable limit value of 0.5 mg/cu m. The diurnal SO2 emission characteristics revealed small maxima in the morning and the late afternoon during the heating season which coincide with the hours of maximum heating. The local distribution of the emissions was characterized by the emission parameters I1 and I2 by Stratmann. The entire city is highly polluted. This high SO2 pollution is caused by the industry and by domestic heaters. The number of remotely heated apartments is low in Leipzig. Only through construction of high stacks and through expansion of the remote heating system can the SO2 concentration in the city s atmosphere be reduced.

19772 APTIC NO. 37785

Chovin, P., J. Duffaud, L. Truffert, R. Heros, J. -L. Geronimi, and C. Wager

AUTOMOBILE-INDUCED AIR POLLUTION IN THE CITY OF PARIS DURING THE SUBWAY STRIKE. *(La pollution de l air de Paris par les automobiles pendant la greve du metropolitain). Text in French. Pollut. Atmos. (Paris), 13(52):308-311, Oct.-Dec. 1971.*

During the subway strike in Paris, from Oct. 5 to 14, 1971, carbon monoxide concentrations were measured by continuously operating instruments in 11 points. In that period, the atmospheric dispersion was hindered by the relatively stable weather. Only the measurement data from five of the 11 instruments were evaluated on the basis of the reference period of 7 mo, available for these five points only. The means for 1 hr, fairly high during the week preceding the strike, were exceeded by 17% during the first week of the strike. A maximum of 76 ppm was observed in one point, and relatively high values were obtained for the first hours of the day, too (26-30.5 ppm). The 40 ppm threshold was exceeded in 9.0% of the time during the first week of the strike, and the corresponding percentage for the 30 ppm threshold was twice that for the reference period. The mean values for periods of 8 hr were exceeded by 18.7% during the first week, with maxima before and during the strike about the same. The 15 and 25 ppm thresholds were exceeded 56.1% of the time in the week before, and 67.2% during the first week of the strike. In a highly polluted area the 15 and 25 ppm thresholds were exceeded 97.2% and more than 50% of the time, respectively. While the mean and maximum values show a slight increase the frequencies of values above the 30 and 40 ppm thresholds are significant.

19773 APTIC NO. 38401

Cralley, L. J., R. G. Keenan, and J. R. Lynch

EXPOSURE TO METALS IN THE MANUFACTURE OF ASBESTOS TEXTILE PRODUCTS. *Am. Ind. Hyg. Assoc. J., vol. 28:452-461, Sept./Oct. 1967. 22 refs.*

The nature and extent of exposure to metals in the manufacture of asbestos textile products are examined. In addition to the metals in the form of minerals associated with the asbestos fiber, a second source of exposure to metals may be alloy particulates abraded and liberated into the air during the processing of the asbestos. Atomic absorption spectrophotometry was used for the analysis of nickel, chromium, cobalt, and manganese contents of chrysotile, crocidolite, and amosite. The metal content of the bulk fiber remained fairly constant as it passed through the different processes, with average concentrations of 0.07-0.09% nickel, 0.03-0.04% chromium, less than 0.01% cobalt, and 0.03% manganese. Ratio increases of metal contents over fiber were computed, and past and present levels of airborne metals are compared.

19774 APTIC NO. 37973

DeRouane, Alain

INDOORS AIR POLLUTION AS RELATED TO OUTDOORS POLLUTION. *(La pollution de l air a l interieur des batiments en relation avec la pollution exterieure). Text in French. Cent. Belge Etude Doc. Eaux, 24(337):553-560, Dec. 1971. 9 refs.*

The relation between indoor and outdoor concentrations were studied on smoke and sulfur dioxide, independent of indoor pollution sources. Daily smoke concentration measurements were carried out inside and outside two different types of buildings. The indoor concentration means were 84.9% and 77.5% of the outdoor concentration, respectively. The outside concentration values were generally higher than the indoor ones. The frequency curves plotted for indoor and outdoor concentrations were approximately parallel, and distributions very close to each other were obtained. The correlations were both accentuated and significant. In the two buildings, 76.44% and 83.91% of the total variance was caused by the regression. The indoor smoke concentrations were highly dependent of the outdoor concentrations. In the relation between indoor and outdoor sulfur dioxide concentrations, influencing factors such as the age of the building, the type of the heating system, the presence of smokers, and the outdoor concentration are involved. The indoor concentrations measured in both buildings were 22.56% and 27.31% of the outdoor concentrations, the difference being highly significant. For the first building, the distributions were highly divergent, with medians in fairly good accordance (28.6% and 27%). The correlation coefficients obtained were 0.46 and 0.046. The indoor concentrations were only slightly influenced by the outdoor concentrations. Other investigations reviewed here showed lower values for indoor than for outdoor concentration variation frequencies. Studies of the sulfur dioxide absorption by different types of surfaces revealed the significance of the character of the surface and of the indoor air circulation.

19775 APTIC NO. 38241

Duuren, H. Van and A. J. Elshout

SOME ASPECTS OF ATMOSPHERIC POLLUTION BY SULPHUR DIOXIDE IN THE NETHERLANDS. *(Enkele aspecten van de atmosferische verontreiniging door zwaveldioxyde in Nederland). Text in Dutch. Ingenieur, 83(15):G17-G28, 1971. 15 refs.*

Sulfur dioxide concentrations (24-hour averages) determined at 16 ground-level air sampling stations through the Netherlands between Oct. 1969 and Sept. 1970 were analyzed according to statistical and geographical parameters, distribution, and atmospheric conditions. The samples were obtained by drawing air through wash bottles for 24 hr, then analyzing photometrically with methylrosaniline chloride. The highest average values were found at the Rotterdam and Dordrecht sampling stations, while the highest individual peaks occurred at Arnhem and Nijmegen. The measurements were then classified according to the prevailing wind direction on the measurement date. An analysis of this distribution revealed that the peaks at Arnhem and Nijmegen occurred on the days when the wind was blowing from the direction of the German Ruhr, and indicated that the half-life of sulfur dioxide in the winter amounts to several hours. Prolonged elevations of sulfur dioxide concentrations over most of the Netherlands during Dec. 1960 occurred during periods when the wind was blowing from the Ruhr area, and during one of these, the atmospheric conditions were highly stable. Thus it appears that a modest sampling network can provide useful information concerning potentially dangerous combinations of air-pollution and meteorological conditions.

19776 APTIC NO. 38592

Georgii, Hans-Walter

DETERMINATION OF THE CO-EMISSION CONCENTRATION WITH CONSIDERATION OF INFLUENTIAL METEOROLOGICAL PARAMETERS. *(Ermittlung der CO-Immissionskonzentrationen unter Beruecksichtigung meteorologisher Einflussgrossen). Text in German. Staub, Reinhaltung Luft, 32(2):71-74, Feb. 1972. 4 refs.*

Concentrations of carbon monoxide in Frankfurt am Main were measured as a function of the time of day and season for areas with different traffic conditions. The measurements were carried out at fixed and random points. The long-term trend of CO emissions was observed ever since the winter of 1967/68. Both in summer as well as in winter a clear and uniform increase of the CO-emission from year to year was observed, which is due to the increase of the number of automobiles from 179,000 in 1966 to 215,000 in 1970. At the same time, the sulfur dioxide emission declined at the same measuring points. Short-term peak CO concentrations of more than 100 ppm occur quite frequently in Frankfurt. An average half-hour concentration of more than 30 ppm however occurs only at inversion conditions. Thus, during some peak hours in the city center, persons travelling in cars are exposed to CO concentrations which are higher than the maximum concentration in working areas (50 ppm).

19777 APTIC NO. 38658

Holt, Ben D., Antoinette G. Engelkemeir, and Adolph Venters

VARIATIONS OF SULFUR ISOTOPE RATIOS IN SAMPLES OF WATER AND AIR NEAR CHICAGO. *Environ. Sci. Technol., 6(4):338-341, April 1972. 15 refs.*

Sulfur-34 variations were measured by mass spectrometry in surface waters, municipal wells, sewage treatment plants, rain, and air in a suburban area west of Chicago. The study was centered on Salt Creek which, with neighboring streams, apparently characterizes the glacial-deposit area as being depleted in S-34, with respect to meteoritic troilite. Three apparent perturbants of S-34 enrichment in the small streams were rain, earth-surface disturbances, and effluents from sewage treatment plants. Deep municipal wells were strongly enriched in S-34 and shallow municipal wells were strongly depleted. Enrichment in rain varied as widely during single storms as from storm to storm. The average enrichment in atmospheric sulfur dioxide and sulfate particulate matter was essentially equivalent to that of rain. (Author abstract modified)

19778 APTIC NO. 38199

Katou, Tasuo and Yoshiyuki Horimoto

RESEARCH OF PHOTOCHEMICAL SMOG MATERIALS. NO. 1. *(Tonai kokagaku sumoggu genin no chosa kenkyu, sono ichi). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):46, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)*

In order to thoroughly investigate the cause of photochemical smog which occurred in Tokyo in 1970, air quality measurements have since been carried out in both Tokyo and Yokohama, by means of gas chromatography. Samples are collected by a low temperature adsorber-concentrator. The aromatic group, such as benzene and toluene, were found in additon to usual gasoline components. Toluene and hexane showed the most significant variation in concentration. Acrolein, which has considerable lachrymatoriness, was also found By using crotonic acid, which reacts with ozone quantitatively, the existence of ozone was examined, but it has been negative so far.

19779 APTIC NO. 38359

Kawamura, Takeshi

AIR POLLUTION IN URBAN AREAS IN JAPAN. *(Nihon no toshi ni okeru taiki osen). Text in Japanese. Chirigaku Hyoron (Geograph. Rev. Japan), 45(3):231-245, March 1972. 25 refs.*

The rapid social and economic development of Japan has resulted in the concentration of population and industry and accelerated air pollution in major cities and their surroundings. The main pollutants are dust, sulfur oxides, and oxidants. The major polluted areas are shown on a map together with their smog indices (the smog index equals AB/1000, where A is the concentration of atmospheric particles such as soot and B is the concentration of sulfur oxides in micrograms/cu m). Cities with the highest indices are: Amagasaki, 36.2; Osaka, 34.9; Tokyo, 31.2; Yokkaichi, 29.4; Kawasaki, 29.0; Suita, 24.7; Sakai, 24.1; Higashiosaka, 20.0; and Kyoto, 19.2. Dust deposits in most industrial cities peaked between 1960-1965 and subsequently declined. The distribution of dust deposits in the Tokyo and Kawasaki areas at the peak of pollution in 1961 is shown. The most polluted areas corresponded to industrial districts. Also shown are the results of the implementation (1967-1970) of the environmental standards relating to air pollution. The standard was not maintained in metropolitan areas and in some industrial and chemical cities. Pollutant concentrations in coastal cities are influenced by land and sea breezes; on the other hand, a morning inversion is the most important factor in the occurrence of air contamination in cities like Kyoto. Photochemical smog episodes occurred in Tokyo, Osaka, and Nagoya in 1971. The smog was caused by the conversion of automobile engine exhaust into oxidants by photochemical reactions with sea breezes.

19780 APTIC NO. 37968

Kifune, Ikuei, Toshiichi Okita, and Riuichi Sugai

RELATION BETWEEN ODOR INTENSITY FOR NUISANCE SOURCE AND ODOROUS GASES OF AROUND KRAFT PULP MILLS. *(Parupu kojo shuhen no akushu gasu nodo to shukido oyobi hasseigen kyodo to no kankei). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):225, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)*

The odor concentration and malodorant concentration in and around the kraft pulp mill in Niigata Prefecture were measured. Samples were collected at the inlet and outlet of the malodorant treatment tower and oxidation tower and at locations 100, 200, 500, 800, 1000, and 1500 m from the source; samples were analyzed by gas chromatography and spectrophotometry. The highest concentration was found at the inlet, i.e., methyl mercaptan 103,484 ppm, dimethyl sulfide 22,754 ppm, and hydrogen sulfide 674.3 ppm which were reduced to 1/2 to 1/300 at the outlet. The ratio of sulfide compounds in the surrounding area was similar to the composition ratio at the source. The relationship between the odorant concentration and odor concentration was quantified according to the Weber-Fechner law.

19781 APTIC NO. 38133

Kubo, Kiyoshi, Eiichi Ito, and Kimiko Hirata

CHEMICAL COMPONENTS IN AIR-BORNE DUST IN THE SOUTHERN INDUSTRIAL AREA OF NAGOYA CITY. *(Nagoya-shi nanbu kogyochiiki ni okeru taikichu fuyufunjinchu no kagakutekiseibun ni tsuite). Text in Japanese. Nagoya-shi Eisei Kenkyushoho (Ann. Rept. Nagoya City Health Res. Inst.), no. 17:79-82, 1970. 4 refs.*

To study relationship between the gross amount of air-borne dust and the amount of chemical components in it, samples of air-borne dust obtained at the rooftop of the Nagoya City Health Research Institute during Oct. 1970 through Jan. 1971 and at six sampling spots in the southern industrial area of Nagoya City were analyzed giving consideration to emission sources and environmental factors. The mean value for the month of chemical components in air-borne dust samples on the rooftop was 0.170 mg/cu m; tar component, 11.3 micrograms/cu m; lead, 1.42 micrograms/cu m; iron, 1.46 micrograms/ cu m; sulfuric acid ion, 11.0 micrograms/cu m; and sulfur dioxide gas in the air, 0.041 ppm. The correlation coefficient between the gross amounts of dust and tar components was 0.93. The amounts of iron, sulfuric acid ion, and sulfur dioxide were well related to the gross amount of dust. At all sampling spots, the highest value was 0.315 mg/cu m, and the lowest value was 0.089 mg/cu m. The iron component showed about 1.2 1.3% of the amount of dust. Lead showed higher values at sampling spots with heavy traffic volume. This means that the lead amount in air-borne dust is affected by automobile exhaust gases. The nearer the sampling spots were to the emission sources, the higher the amount of dust.

19782 APTIC NO. 37939

Lahmann, E. and F. Herzel

PESTICIDE DETERMINATION IN THE AIR AND IN PRECIPITATION. *(Pestizid-Bestimmung in Luft und Niederschlaegen). Text in German. Gesundh. Ingr., 92(12):366-368, Dec. 1971. 9 refs.*

For the pesticide determination in the atmosphere the following sampling methods can be used: collection of precipitation, absorption in liquids, separation by filters, and adsorption. The first method is the simpiest and has been used for measurements of the pesticide concentration in the atmosphere in Berlin-Dahlem. Liesegang-Loebner collection bottles were used. The exposure time was usually one month. The rain water samples were extracted with carefully distilled hexane; chlorinated hydrocarbon insecticides (Lindane, Aldrin, Dieldrin, DDE, and DDT) were determined by gas chromatography. The substances dissolved in the rain water as well as those adhering to dust were extracted. The measurements were taken over a period of one year. The maximum concentration in an example for DDT was 15.5 mg/100 sq m (undissolved) and 401 mg/100 sq m of dissolved matter. In general the cconcentrations were of the same magnitude as those in Great Britain and the U. S.

19783 APTIC NO. 38529

Lahmann, Erdwin

CO CONCENTRATIONS IN THE CITY OF BERLIN (IN STREETS, TUNNELS, RESIDENTIAL AREAS, AND IN WATER). *(CO-Konzentrationen im Berliner Stadtgebiet (Strassen, Tunnels, Wohngebiete und Gewaesser)). Text in German. Staub, Reinhaltung Luft, 32(2):74-77, Feb. 1972. 11 refs.*

At six measurement stations located in Berlin at different altitudes (at 0, 75 cm, 1.5, 3, 6, 12, and 24 m), the average carbon monoxide concentration was measured in 1965-1971. The CO decreased linearly when the height in which the measurement was taken was plotted in logarithmic scale. Of the concentrations measured, 93% were measured at 1.5 m, 79% at 3 m, 68% at 6 m, 58% at 12 m, and 44% at 24 m above the ground. By a road with heavy traffic, the maximum half-hour value was 61, and the maximum daily average was 32 ppm CO. In tunnels the measured CO content was over 100 ppm (half-hour average). Far from road traffic, CO increased by 20 ppm in 10 hr as a result of steady weather conditions. On lakes with motor boat traffic, a maximum half-hour average of 10 ppm CO was reached.

19784 APTIC NO. 38528

May, Hans, Franz Josef Dreyhaupt, Eberhard Plassmann, and Werner Mueller

NEWER STUDIES CONCERNING THE EMISSIONS OF AUTOMOBILES IN THE URBAN AREA OF COLOGNE. *(Neuere Untersuchungen ueber die Emissionen von Kraftfahrzeugen im Ballungsgebiet Koeln). Text in German. Staub, Reinhaltung Luft, 32(2):66-70, Feb. 1972.*

With the aid of aerial photography and traffic counts the traffic density in the various streets of Cologne was determined. The traffic conditions (street condition, traffic regulation by signals or signs and car exhaust gas emissions during the operating conditions of acceleration, cruising, slow-down, and halt for representative car models were simulated on a dynamometer. Unburned hydrocarbons, carbon monoxide and nitric oxide emissions were measured with infrared gas analysis. During halt, acceleration, and at the lowest driving speeds, Otto engines are operated with a considerable lack of air which causes the development of high concentrations of CO and unburned hydrocarbons; the NO concentration is low and so is the exhaust gas discharge. With increasing speed, the exhaust gas volume, NO, and CO increase and hydrocarbon emissions drop. Contrary to the emissions/l fuel, the emissions of CO, HC, and NO time unit rise progressively with increasing speed. At an average speed of 50 km/hr the emissions are 14 times higher than during idling. For a section of 0.82 km of the busiest street in Cologne, a CO emission peak between 4 and 6 pm was measured from Mondays to Fridays. During this period the average speed drops from 20 km/hr to 14 km/hr. As a consequence, the residence time for all cars in this section increases at a ratio of 20:14.

19785 APTIC NO. 38164

McNesby, J. R., R. Byerly, Jr., and Howard E. Swanson

IDENTIFICATION AND STRUCTURE OF CRYSTALLINE COMPONENTS PARTICULATE MATTER IN AIR POLLUTION SAMPLES. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:22-23, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

A one-month accumulation of dust fall samples obtained from eight Baltimore sampling stations for the months of December, February, and March were analyzed by X-ray diffraction. Most of the samples showed the same compounds found in fly ash produced in large coal-burning plants. The main products were quartz, magnetite, hematite, and calcite plus some unburned coal and amorphous silicates. Other materials present in small amounts were graphite, gypsum, and dolomite. The diffraction patterns were suggestive of the product sources.

19786 APTIC NO. 38335

Mentesana G., L. Coniglio, P. Deodato, and G. Navarra

OBSERVATIONS ON AIR POLLUTION IN THE CITY OF PALERMO DUE TO THE THERMOELECTRIC POWER PLANT ENEL. *(Rilievi e considerazioni sull inquinamento atmosferico della citta di Palermo, determinato dalla centrale termoelettrica dell ENEL). Text in Italian. Folia Med. (Naples), 52(12):837-860, Dec. 1969. 20 refs.*

The study undertaken from Oct. 20 to Nov. 10, 1969 was concerned with an area within 600 m from the source of pollution. The plant emits 300,000 cu m waste gases/hr. Two measuring stations, one at a distance of 300 m from the plant (I), the other at 600 m (II) measured particulates, sulfur dioxide, and nitrogen oxides. Particulates emitted at station I amounted to 104.8 mg/sq m/hr, at station II 62.4 mg/sq m/hr; the SO2 concentration measured by both stations was 0.1 ppm; nitrogen oxides measured by station I were 0.14 mg/cu m. The dust collected by station I contained 28.9% silica, by station II, 31.1% silica. Other elements in the dust were iron, aluminum, magnesium, sodium, and potassium. Particulate emission during the observation period at station I was 14.8 tons/sq km, at station II 8.8 tons/sq km. Comparative levels are 8.5 tons for Milan, 6.5 tons for Bologna, and 7.4 tons for Padova. Thus, in Palermo due to special meteorological, climatic, and topographic conditions, the principal problem is particulate pollution while gaseous pollution is insignificant. In view of the hazard posed by this particulate emission to the respiratory organs of the inhabitants of Palermo, the study recommends the application of technical control measures to reduce the emission of particulates by the power plant investigated.

19787 APTIC NO. 37766

Meszaros, E.

THE SIZE DISTRIBUTION OF WATER SOLUBLE PARTICLES IN THE ATMOSPHERE. *Idojaras (Budapest), 75(5/6):308-314, Sept./Dec. 1971. 25 refs. (Presented at the Hungarian Meteorological Society Seminar on Atmospheric Chemistry, July 23, 1971.)*

The size distribution of water-soluble particles in the atmosphere was investigated using a cascade impactor backed up by membrane filters, polystyrene filters, and glass fiber filters. Samplers were subsequently analyzed for sulfate by the turbidity of the barium sulfate suspension, for chloride by nephelometry, and for ammonium, nitrates, and calcium by colorimetric methods. In the summer, about half of the sulfate and ammonium ions, which constituted a majority of the water soluble particles, were in the Aitken size range. With decreasing particle size, the relative quantity of water-soluble substances increased. The mass median radius of calcium particles was very small. Nitrate and especially chloride particles were larger than other soluble nuclei. In the winter, the calcium and sulfate particles were larger than in the summer. Conversely, ammonium ions were associated with smaller particles in the winter than in the summer. The formation of sulfate particles and the variation of visibility caused by the growth of water-soluble particles as a function of relative humidity are discussed. Cloud physics are also considered.

19788 APTIC NO. 38117

Nakai, Yoshio, Takashige Watanabe, Yasuaki Hara, Koichi Umehara, Takashi Maejima, Ryoji Takahashi, and Kazuaki Endo

ON THE CONCENTRATION OF HYDROGEN SULFIDE IN THE ATMOSPHERE SURROUNDING TAGONOURA HARBOUR DURING THE DREDGING WORK OF

SEDIMENTS IN THE HARBOR. (Shizuokaken Tagonoura-ko no hedoro shunsetsu ni tomonau taiki kankyochu ryuka suiso sokutei kekka ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):223, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The hydrogen sulfide concentrations at the locations around the Tagonoura harbor (district A) and around the sediment treatment plant (district B) were measured during the dredging work from April 21 to May 31, 1971. The automatic H2S analyzer and in some cases, the methylene blue method were used. In district B, H2S was undetectable. In district A, the H2S concentration was related definitely to the tide, but not to the dredging work at all. The H2S concentration reached to the maximum, up to 0.6 ppm, at every low tide.

19789 APTIC NO. 38099

Roca, Enrique Viayna

SOME ASPECTS OF AIR POLLUTION OF RIBERA DE ARRIBA (OVIEDO) PRODUCED BY A SINGLE SOURCE. *(Algunos aspectos de la contaminacio atmosferica de Ribera de Arriba (Oviedo), producida por fuente unica). Text in Spanish. Rev. San. Hig. (Spain), 45(8):801-810, Aug. 1971. 19 refs.*

Air quality at Soto de Ribera and Argama was measured from May 1964 to Nov. 1965 at no more that 500 m from the sole source of pollutant emissions, an electric power plant. Concentrations of particulate matter ranged within 441-1202 mg/sq m (minimum and maximum daily values). The net gaseous acidity expressed as sulfur dioxide was, at any given moment, at a maximum of 330 micrograms/cu m.

19790 APTIC NO. 38393

Selikoff, I. J., W. J. Nicholson, and A. M. Langer

ASBESTOS AIR POLLUTION IN URBAN AREAS. *Preprint, American Medical Association, Chicago, Ill., 33p., 1970. 38 refs. (Presented at the Air Pollution Medical Research Conference, New Orleans, La., Oct. 5, 1970.)*

The history of epidemiological investigations into the effects of asbestos on human health, measurement methods and variables for the determination of asbestos air pollution in urban areas, and various aspects of the associated disease are reviewed. Major problems involved in the determination of asbestos concentrations include fiber identification, particulate classification, varieties of asbestos fibers, size determination, and quantitation. Air samples were collected in New York City using membrane filters and hi-vol samplers and were analyzed by electron microscopy. The samples from Manhattan had higher concentrations of asbestos than those from other boroughs. The lowest values were determined at sites most distant from densely populated business areas. Average amounts ranged within 10-100 times 10 to the minus 9th power g/cu m of air sampled. Sources, both natural and industrial, and controls are reviewed.

19791 APTIC NO. 38478

Simecek, Jaroslav

DUST MEASUREMENTS IN AN ASBESTOS PLANT AND ITS VICINITY. *(Staubuntersuchungen in einem Betrieb fuer Asbestverarbeitung und in seiner Umgebung). Text in German. Staub, Reinhaltung Luft, 31(12):493-496, Dec. 1971. 5 refs.*

Dust measurements inside the asbestos processing plant were carried out by means of three gravimetric methods. For the determination of the particle size distribution, a two-stage dust measurement unit (DP-20) was used. For the determination of the dust pollution in the vicinity of the plant, the samples were taken a distance of 300 m from the plant in the northwestern direction. The prevailing winds came from the west. With a pump, 55 l/min air were drawn through a membrane filter. The filter was installed 2 m above the ground. The samples were taken every day between 6 am and 2 pm. The results of the outdoor measurements have shown that the maximum value of 0.15 mg/cu m was exceeded in the summer months in 20% of the cases and in the winter months in 50% of the cases. The highest concentrations were measured in the months of February and March. The asbestos particles present in the samples could be detected under the electron microscope. The geometric averages of the diameter of the asbestos particles ranged from 0.235 to 0.33 micron, their length from 2.1 to 3.5 micron. The concentration of asbestos particles was less than 1.7 particles/ccm, the asbestos content less than 1% by weight.

19792 APTIC NO. 38206

Takahashi, Hisakazu, Hitoshi Yunoki, and Hideo Noriki

INVESTIGATION ON OFFENSIVE ODOR AT A CERTAIN CHEMICAL FACTORY. *(Bou kaseijo ni okeru akushu chosa ni tsuite). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):440, 1971.*

An investigation was carried out for 3 days at a certain chemical factory. The average amount of materials treated at this factory was 7-8 tons/day and about 220 sheets of animal skin were treated/day. Measurement of odor was carried out through every process of fish, bone, feather, and animal bone treatment. The ASTM injector method and Kinoshita type method were applied as a sensitivity test, and gas chromatography and the Kitagawa detecting tube method were also introduced as instrumental analysis. As a result, it was recognized that offensive odor emitted through fish bone, feather, and animal bone processing was at a high level. And acrolein was detected.

19793 APTIC NO. 38481

Varkonyi, T. and M. Kertesz-Saringer

A SMOG SITUATION IN BUDAPEST ON JANUARY 22 AND 23 1970. *(Eine smog-Situation in Budapest am 22 und 23. January 1970). Text in German. Z. Ges. Hyg. Ihre. Grenzgebiete (Berlin), 17(12):887-888, Dec. 1971.*

Each year the air pollution in Budapest rises to particularly high concentrations three or four times during the months from November to February. One such condition prevailed on Jan. 22 to 23, 1970. The individual stages of the smog development were studied by means of the measurement of the sulfur dioxide concentration. Early in the morning of January 22, the SO2 concentration rose to 3.30 mg/cu m which is 16 times as high as the maximum allowable long-term concentration of 0.20 mg/cu m and five times as high as the maximum allowable short-term concentration of 0.60 mg/cu m. This extremely high concentration began to subside at 1 pm. The smog began to lift on January 23 at 9 pm. The average SO2 concentrations were measured again on January 25. Measurement of the nitrogen dioxide concentration by the Saltzmann method yielded the following data: on Jan. 22 at 10 am, 0.10 mgN02/cu m and at 8 pm 0.06 mg/cu m; Jan. 23 at 8.30 am, 0.05 mg/cu m, at 10 am 0.06 mg/cu m, and at 12.30 pm, 0.03 mg/cu m. The maximum concentration was measured on Jan. 22 at 5.30 am with 0.25 mgN02/cu m. The dust concentration rose likewise from 0.30 to 0.40 mg/cu m to 0.74 mg/cu m on Jan. 22 and to 0.84 mg/cu m on Jan. 23. The sick calls rose parallel with the SO2 concentration.

19794 APTIC NO. 37823

Voytov, V. T.

EVALUATION OF GASEOUS CONTAMINATION IN THE ELECTROLYSIS SHOPS OF THE BRATSK ALUMINUM PLANT. *(Operativnaya otsenka zagazovannosti tsekha elektroliza na BrAZe). Text in Russian. Tsventn. Metal., no. 10:45-47, Oct. 1971.*

The quality of the technological equipment was studied, and the contributions of human carelessness to air pollution were analyzed. Based on the weekly surveys of electrolyzers, burners, and exhaust fans, contribution indices were established for the different equipment and stages of technology. The number of non-hermetic electrolyzers was regularly determined. As a result of the steps taken, the number on non-hermetic electrolyzers dropped from 32.3% in Sept. 1969 to 15% in Feb. 1970. General improvement in air quality was reached, with concentrations below the threshold. Hydrofluoric acid and fluoride concentrations of 0.27 mg/cu m and 0.42 mg/cu m, respectively, were measured in Feb. 1970, against the maximum allowable values of 0.8 mg/cu m and 1 mg/cu m. In addition, drastic drop in the volume of atmospheric emissions was obtained.

ATMOSPHERIC INTERACTION

19795 APTIC NO. 38329

Tomakomai City (Japan), Local Weather Bureau and Tomakomi City Government (Japan)

TERRESTRIAL WIND OF TOMAKOMAI CITY. *(Tomakomi-shi nai no chijo fu ni tsuite). Text in Japanese. 24p., April 1971.*

The localized wind, depending upon the topography and geographical features in Tomakomai City, an industrial city, was investigated. The direction and velocity of the wind were observed and streamline analysis of the air current was carried out employing isogonic line method. Tomakomai City opens to the beach (south) with the Ishikari lowland as its axis in concave; in winter the north wind is dominant and in summer the southeastern wind dominates. The percentage of the number of observations made for terrestrial wind against the direction of the geostrophic wind were 188% in north wind, 164% in southeastern wind, 148% in west wind, and 17% in northwestern wind. When sea-wind and land-wind were compared from autumn through early spring, land-wind was frequent, especially during the months of January and February. The ratio of the geostrophic wind and the actually measured wind with the geostrophic wind as the standard showed the southeastern wind was the strongest. According to the analysis of streamline, the effect of two hilly areas, 50-60 m high, located in the northeast and in west, on the general current in sough and northwest was big.

19796 APTIC NO. 38341

Tokyo Metropolitan Environmental Protection Research Inst. (Japan)

INVESTIGATION ON PHOTOCHEMICAL SMOG IN TOKYO. (REPORT 1). *(Tokyo kokagaku smoggu ni kansuru chosa kenkyu. Dai 1 po). Text in Japanese. 364p., July 1971. 73 refs.*

Changes in the photochemical condition up to the present, the actual condition of air pollution, the relation to geographical features, and forecasting of the occurrence of photochemical smog are discussed, based on past measuring data. The climatic condition when high concentrations of oxidant occurred, the fluctuation of concentration by day and time, and the relation to nitrogen oxides and measuring method were discussed. Results of an investigation on injuries of plant and vegetables by photochemical smog were also included. Atmospheric reactions and concentrations of sulfur dioxide, nitrogen oxides, peroxyacetyl nitrate hydrocarbons, and carbon monoxide are discussed. Seasonal and meteorological conditions effecting smog are mentioned.

19797 APTIC NO. 38384

Ministry of International Trade and Industry (Japan) and Kitakyushu City (Japan)

PRELIMINARY INVESTIGATION (AIR POLLUTION) REPORT FOR KITAKYUSHU AREA INDUSTRIAL POLLUTION COMPREHENSIVE STUDIES. *(Kitakyushu chiku sangyo kogai sogo jizen chosa (taiki kankei) hokokusho). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 7(12):698-708, Dec. 1971.*

An on-site investigation of the Northern Kyushu Industrial area (459 sq km, population 1,050,000) was conducted and dispersion calculations and tests in wind tunnels were carried out in order to plan for the future control and prevention of pollution. Settling particles and sulfur oxide concentrations were obtained from the records kept since 1959. The records of the electroconductivity measurement of sulfur oxides showed a sudden increase of sulfur dioxide since 1970, but the lead dioxide records showed a drastic increase since 1966. The quantity of settling particles decreased between 1962 and 1966, but began to increase again after 1967. The highest concentration of suspended particulate was noted at the Kurosaki Health Center, which was 4.12 mg/cu m, but the yearly average of records at nine locations in Kurosaki city was 0.08 mg/cu m. The ground sulfur dioxide concentration for 55 factories in the Kitakyushu City area were calculated by theory, and measured by wind tunnel tests. Respective production plans, soot emission sources, number of stacks, heights, emission flow rates, SO2 quantity, total emission quantity, and the quantity and quality of fuels were investigated, calculated, and projected for 1975. Soot emission installations in 1975 are estimated to be 492, stack numbers 399, fuel consumption 5,140,000 kl/yr with some supplementary gas and oil. The quantity of sulfur oxides emitted in 1975 is estimated to be 12,260 N cu m, and average SO2 concentration will be 624 ppm. This is approximately 6% less than 660 ppm of the record at the time of investigation (1969).

19798 APTIC NO. 38702

Altshuller, Aubrey P. and Joseph J. Bufalini

PHOTOCHEMICAL ASPECTS OF AIR POLLUTION: A REVIEW. *Environ. Sci. Technol., 5(1):39-64, Jan. 1971. 134 refs.*

Literature released since 1964 on the photochemical aspects of air pollution is reviewed. The topics include nitric oxide oxidation and inorganic reactions; atomic oxygen and ozone reactions; singlet oxygen and its importance to air pollution; aldehyde and ketone photolysis; sulfur dioxide photolysis; synergistic effects; photooxidation of commercial solvents; product formation with emphasis on hydroperoxides, nitric acid, and peroxybenzoyl nitrate; reactivity measurements for hydrocarbon consumption, nitric oxide oxidation, oxidant formation, and eye irritation; aerosols; natural pollution; and actinometry. Research proposals are also considered. (Author abstract modified)

19799 APTIC NO. 38611

Berlyand, O. S. and V. N. Petrov

ON THE INFLUENCE OF ATMOSPHERIC PARAMETERS ON THE DIFFUSION AND FALLOUT OF CONTAMINANTS FROM CLOUDS DRIFTING OVER LARGE DISTANCES. *(O vliyanii atmosfernykh parametrov na diffuziyu i osazhdenie primesi iz oblakov, rasprostranyayushchikhsya na bolshie passtoyaniya). Text in Russian. Izv. Akad. Nauk SSSR, Fiz. Atmosfery i Okeana, 7(11):1209-1214, Nov. 1971. 5 refs.*

For clouds drifting over large distances, mean values of atmospheric parameters should be applied, and possible variations of the basic characteristics of diffusible contaminants, particularly the speed variations in diffusive fallout, and intensity of rain should be evaluated. The speed variations in the dry fallout of radioactive fission products are in a range of 0.1-10 cm/sec. Diffusion formula and precipitation density on soil surface are given as a function of time for different parameter values. The mechanism of the rain washout of radioactive fission products is dependent on both the duration and intensity of the rain, the rate of precipitation and size of the particles, and the adsorption capacity of rain drops. An equation is given for the concentration distribution in a radioactive cloud drifting at wind speed. The total amount of contaminants scavenged can be expressed by an integral equation. A relationship is established for the variation of the concentration of radioactive contaminants in a cloud in the case of partial scavenging, and the amount of contaminants reaching the surface in a given point. A reduced scavenging effect was found with decreasing particle size, as a function of the raindrop diameters, and durations of rain. The amount of contaminants scavenged by rain may be 2-4 times the amount deposited without rain, depending on the duration and intensity of the rain. Maximum experimental values are given for the ratios of dry to scavenged fallouts as a function of the distance from the explosion epicenter.

19800 APTIC NO. 38632

Brown, R. M., L. A. Cohen, and M. E. Smith

DIFFUSION MEASUREMENTS IN THE 10-100 KM RANGE. *J. Appl. Meteorol., 11(2):323-334, March 1972. 10 refs.*

Recent studies of particulate and gaseous materials in the atmosphere have raised important questions about diffusion at distances of 10-100 km. A photometric densitometer, initially developed for a quantitative study of oil-fog concentrations at ground level, was adapted for use in an aircraft. Real-time measurements of ground-level and airborne particle concentrations and plume behavior are presented to distances of 120 km, and the implications of these data in terms of large-scale dispersion are discussed. The measurements were made in the area from Brookhaven to New York City. (Author abstract)

19801 APTIC NO. 38216

Calvert, Jack G., J. Alistair Kerr, Kenneth L. Demerjian, and Robert D. McQuigg

PHOTOLYSIS OF FORMALDEHYDE AS A HYDROGEN ATOM SOURCE IN THE LOWER ATMOSPHERE. *Science, 175(4023):751-752, Feb. 18, 1972. 12 refs.*

The rates of formaldehyde photodecomposition into hydrogen and formyl radicals and hydrogen and carbon monoxide molecules in sunlight-irradiated atmospheres were estimated from extinction data and photochemical results. The data should prove useful in the development of models for the chemical changes that take place in polluted atmospheres. The rate data predict that the half-life of CH20 due to photodestruction in the sunlight- irradiated low atmosphere is about 75 min. (Author abstract modified)

19802 APTIC NO. 38609

Caspar, J. W.

THE IMPORTANCE OF METEOROLOGICAL PARAMETERS FOR QUESTIONS OF AIR POLLUTION. *(Die Bedeutung meteorologischer Parameter fuer Fragen der Luftverschmutzung). Text in German. Preprint, Deutscher Wetterdienst, Offenbach/Main (West Germany), 9p., March 1972. (Presented at the Fachtagung Umweltverschmutzung, Frankfurt/Main, March 21-24, 1972.)*

The dilution of emissions depends on the wind and on the temperature layering. The pollution in the immediate vicinity of a pollution source is higher during weaker winds. With stronger winds the pollutants are carried to more distant areas, so that lower concentrations are found in the immediate vicinity. With high temperature lapse rates, e.g., 1 C per 100 m height, the turbulence is high and the pollutants are carried to higher altitudes by intense vertical exchange. The lowest vertical pollutant transport occurs during temperature inversions. An illustration of plume behavior during various temperature lapse rates and at inversion is given. The knowledge of meteorological conditions for air exchange is important in two fields, for the smog alert service and for the creation of master plans for industrial centers and residential areas. In the Federal Republic of Germany all meteorological paramaters which are important for evaluation of the degree of pollution on the ground level are monitored by the Deutschen Wetterdienst. Various states of the Federal Republic of Germany have a smog alert service. North Rhine Westphalia has provided such service ever since April 1964. It is important to know the ventilation conditions prior to the creation of master plans. This knowledge helps to prevent the erection of a new residential section on the leeward side of an emission source.

19803 APTIC NO. 38666

Chamberlain, A. C. and S. A. Penkett

ATMOSPHERIC POLLUTION--PRESENT TRENDS AND FUTURE PROBLEMS. *Contemp. Phys., 13(2):179-198, March 1972. 19 refs.*

The amount of smoke and sulfur dioxide in the atmosphere is considered in relation to the source of these pollutants and the processes of dispersion or deposition. The amount of SO2 in the air is much less, in relation to the output from stacks, than the amount of smoke and this is considered primarily due to the rapid absorption of SO2 at the ground surface. Measurements of the particle size and chemical form of the atmospheric aerosol, both at Harwell and at Tees-side in Great Britain, are discussed. Ammonium sulfate constitutes a high proportion of the soluble fraction. Pollution from motor vehicles is assuming more importance, and the influence of pollutants such as lead, oxides of nitrogen, and hydrocarbons is discussed. Recent laboratory work at Harwell has shown that photochemical oxidation of SO2 may be more important than has been previously supposed. The effects of atmospheric pollution on visibility, vegetation, and human health are briefly considered. The human effects of air pollution are overshadowed by the much greater effect of smoking. An urban factor in bronchitis and similar diseases has been observed, but it has not been possible to associate this with any particular constituent of pollution. (Author summary modified)

19804 APTIC NO. 38621

Cox, R. A.

QUANTUM YIELDS FOR THE PHOTOOXIDATION OF SULFUR DIOXIDE IN THE FIRST ALLOWED ABSORPTION REGION. *J. Phys. Chem., 76(6):814-820, March 1972. 20 refs.*

The quantum yield for sulfur trioxide production was determined for the photolysis of sulfur dioxide alone, SO2 and air, and SO2 and oxygen in the wavelength region 240-400 nm in a static system at room temperature. A method was developed for the extraction of gaseous reaction products in an aqueous solution and the determination of SO3 as sulfate ion. At low concentrations of SO2 relative to 02 or air, quantum yield was 0.001 but increased with the initial concentration ratio SO2-02 to a maximum of about 0.005. In pure SO2, quantum yield was lower than when small amounts of 02 were present. The quantum yields were considerably lower than the previously reported values for the photooxidation of SO2 under similar conditions, indicating that high values may result from a surface reaction. The results were reasonably consistent with current ideas on the mechanism of SO2 photolysis. By extrapolation from the results for the SO2-air mixtures, the quantum yield for the photooxidation of SO2 in the atmosphere by natural sunlight was estimated at 0.003. (Author abstract modified)

19805 APTIC NO. 38647

Csanady, G. T.

CROSSWIND SHEAR EFFECTS ON ATMOSPHERIC DIFFUSION. *Atmos. Environ., 6(3):221-232, March 1972. 6 refs.*

Some experimental data on atmospheric diffusion over a medium distance range (approximately 30 km) were analyzed in an attempt to discover any effects on lateral spread attributable to the skewed wind profile of the planetary boundary layer. The observations analyzed were obtained over natural terrain containing woodlots and villages in Arkansas. Wind shear effects on diffusion were considered significant when the cloud decisively outgrew the size predicted by the Hay-Pasquill technique from fixed point cross-wind velocity fluctuations. Such significant effects were found on few occasions only, associated with quite extreme rates of cross-wind shear, accompanied by strong stability. Convection and turbulence are also considered. (Author abstract modified)

19806 APTIC NO. 37915

Dimitriades, B.

USE OF 14C IN STUDYING POLLUTION OF THE AIR BY PETROLEUM HYDROCARBONS. *Isotop. Radiat. Technol., 9(1):63-64, Fall 1971. 5 refs.*

The interactions in hydrocarbon mixtures and the participation of carbon monoxide in smog formation were studied using carbon(14) as a tracer. The stoichiometry and kinetics of nitrogen-oxide-sensitized photooxidation of 1-butene and the reactant olefin, both alone and in mixtures with other hydrocarbons and aldehydes were determined. The extent of olefin reaction varied widely with the nature of the companion reactant. The most striking results were obtained with aldehyde; butene consumption was accelerated by formaldehyde and inhibited by acetaldehyde and propionaldehyde with no significant effect on stoichiometry. The results of irradiating carbon monoxide with artificial sunlight in the absence and presence of hydrocarbon and nitrogen oxide mixtures show that CO participates in smog-forming reactions and is oxidized to CO2 at a rate equal to 0.1%/hr exposure to sunlight. Based on this rate of oxidation, CO lifetime in the atmosphere is 0.3 yr, a value that seems more reasonable than the 2.7-year value previously obtained.

19807 APTIC NO. 38660

Egan, Bruce A. and James R. Mahoney

NUMERICAL MODELING OF ADVECTION AND DIFFUSION OF URBAN AREA SOURCE POLLUTANTS. *J. Appl. Meteorol., 11(2):312-322, March 1972. 25 refs.*

A numerical, grid-element model was developed for the study of air pollution transport from urban area-type sources. This advection-diffusion model is especially useful for the estimation of air pollution concentrations under conditions of spatial and time varying emissions, velocities, and diffusion rates. The pseudo-diffusive errors associated with conventional finite difference approximations to advective transport are eliminated by a material conserving computation procedure involving the zeroth, first, and second moments of the concentration distribution within each grid element. Extensions of the procedure are suggested for retention of sub-grid-scale resolution of concentration values necessary in the study of transport of chemically reactive materials, or for the incorporation of emissions from point and line sources. A novel procedure is presented for the numerical simulation of horizontal diffusion from area sources which can be used to model empirically observed dispersive growth rates. (Author abstract modified)

19808 APTIC NO. 38249

Ensor, David S., William M. Porch, Michael J. Pilat, and Robert J. Charlson

INFLUENCE OF THE ATMOSPHERIC AEROSOL ON ALBEDO. *J. Appl. Meteorol., 10(6):1303-1306, Dec. 1971. 20 refs.*

The possible climatic effects of the secular increase of aerosols from man s activities were coupled with the microphysics of the aerosol properties. The magnitude of the critical aerosol absorption coefficient to backscatter coefficient was estimated for a model atmosphere corresponding to cooling or heating of the earth with increasing aerosol concentration. The ratio of the absorption coefficient to the backscatter coefficient was calculated with Mie theory assuming a Junge particle size distribution and spherical particles as a function of the imaginary part of the particle refractive index and the size distribution slope. Comparing the ratio of the absorption coefficient to the backscatter coefficient calculated from Mie theory to the ratio of the critical aerosol absorption coefficient to the backscatter coefficient, cooling might ensue if the imaginary part is less than 0.001, while heating may result if it is greater than 0.1. (Author abstract modified)

19809 APTIC NO. 38240

Frisken, William R.

EXTENDED INDUSTRIAL REVOLUTION AND CLIMATE CHANGE. *Trans. Am. Geophys. Union, 52(7):500-508, July 1971. 27 refs.*

If the industrial revolution continues at the present rate, it is only a question of time until human activities begin to change the climate of the earth. However, the long-term effects on climate of atmospheric carbon dioxide from fuel combustion, water vapor from supersonic jets, man-made aerosols, and heat from energy conversion are not predicted with sufficient accuracy by general circulation models or one-dimensional models. The former are too time consuming to allow experiments in evolution of climate over extended periods of time and too naive in their present form; the utility of the one-dimensional models is limited by their inability to deal with more than one parameter at a time. Some scientists feel it will be possible to get a working understanding of the effects of human activity on climate by varying the input conditions of surface and atmospheric albedo, concentration of infrared-absorbing molecules in the atmosphere, level of solar activity, and amount of cloud cover to the general circulation model. For credible long-range forecasts, such an improved model should be coupled to a simpler hydrostatic model.

19810 APTIC NO. 38098

Fuhs, Allen E.

WAVE STRUCTURE OF EXHAUST FROM TRANSONIC AIRCRAFT. *J. Aircraft, 8(4):280-281, April 1971. 5 refs.*

For a periodic jet, the streamline dividing the jet from the ambient air stream takes on a shape like a corrugated cylinder. For a nonperiodic jet the dividing streamline simply diverges if the jet shock is strong or converges and then diverges once if jet shock is weak. Viscous effects tend to wash out the wave pattern. In a consideration of jets exhausting into a moving airstream, the use of the reflection coefficient R in place of k provides more insight to jet wave patterns and permits one to draw a neat map of the different regions for the reflection coefficient.

19811 APTIC NO. 38118

Fujii, J., T. Hasegawa, and A. Sugimae

TREACE METAL IN SUSPENDED PARTICULATES (VIII). *(Fuyu funjinchu no kinzoku seibun (Daihachiho)). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):216, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)*

Diurnal and hourly variations in the atmospheric lead concentration attributed to auto exhaust were measured in Osaka. Particulate matter was collected on glass fiber filters using a high-volume air sampler and determined by emission spectroscopy. The results of one month continuous sampling indicated that the diurnal variation at two different locations, one with heavy traffic and ther other with less traffic, were similar. This indicates the effect of meteorological conditions such as wind speed. The plotting of wind speed versus lead concentration clearly indicates the marked effect of wind speed, and the gradient of the regression curve is larger when traffic is heavier. The hourly variations in lead concentration and wind speed showed similar patterns, which also corresponded to the traffic pattern. The vertical distribution of lead concentration and particle-size distribution are also reported.

19812 APTIC NO. 38116

Fukuoka, Saburou, Masashi Ito, and Toshio Odaira

METEOROLOGICAL CONDITION IN PHOTOCHEMICAL SMOG. *(Kokagaku sumoggu hasseiji ni okeru kisho joken ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):109, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)*

There were 15 days with oxidant concentrations above 0.15 ppm in Tokyo in 1967, 14 in 1968, 9 in 1969, and 22 in 1970. The weather on high oxidant concentration days was generally sunny and clear, though high oxidants also occurred on cloudy days, depending on the other meteorological conditions. The visibility was greatly reduced, due to the photochemical smog formation; the average visibility at 5:00-7:00 pm on such days was less than 4.0 Km. The wind direction was less related to the oxidant concentration than other pollutants. The oxidant concentration was generally higher at 1.0 3.9 m/s wind speed than at the stagnant condition. The atmospheric stability and sea-land breezes were also related, however, no quantitative relationship existed between oxidant concentration and temperature or relative humidity.

19813 APTIC NO. 37796

Georgii, H. W. and W. Vitze

GLOBAL AND REGIONAL DISTRIBUTION OF SULFUR COMPONENTS IN THE ATMOSPHERE. *Idojaras (Budapest), 75(5/6):294-299, Sept./Dec. 1971. 14 refs. (Presented at the Hungarian Meteorological Society, Seminar on Atmospheric Chemistry, July 23, 1971.)*

New information on the global and regional distribution of sulfur dioxide and sulfates in atmospheric aerosols was obtained during cruises in the Atlantic Ocean and in a series of aircraft ascents in Germany. There were significant variations in the latitudinal distribution of sulfate in aerosols over the Atlantic but not in the latitudinal distribution of SO2. The background sulfate concentration varied between 0.5-2.5 micrograms/cu m; however, the advection of particles from the Sahara desert caused the background concentration to increase to 3-4 micrograms/cu m sulfate ion. The transport of sulfate-containing continental aerosols over long distances is thus a source of sulfate in ocean aerosols as well as the ocean itself. The sulfate ion/SO2 ratio was 1.1 to 5:1 in maritime areas; 1:1 to 1:2 in unpolluted areas of Europe; and 1:10 to 1:40 in heavily polluted Frankfurt. Based on these findings, the total mass of sulfate suspended in the atmosphere is of the same order of magnitude as the SO2 concentration in an unpolluted atmosphere far from anthropogentic SO2 sources. Over the ocean sulfate may exceed SO2 due to particle production at the ocean surface. The vertical distribution of sulfate-containing particles of different sizes was also investigated. At ground level 25% of the total sulfate was contained in particles smaller than 0.2 micron, but at 2500 m above ground 75% of the total sulfate was contained in this size class. Since the mass median radius of sulfate particles changed with altitude, 50% of the sulfate mass in the middle troposphere must be contained in Aitken nuclei.

19814 APTIC NO. 38134

Gutsche, B.

DEVELOPMENT TENDENCIES AND PERSPECTIVES OF MATHEMATICAL METEOROLOGICAL DIFFUSION MODELS FOR URBAN AREAS. *(Entwicklungstendenzen und Perspektiven mathematisch-meteorologischer Diffusionsmodelle fuer Stadtgebiete). Text in German. Preprint, 12p., 1972. 21 refs. (Presented at the Fachtagung Umweltverschmutzung, Frankfurt/Main, March 21-24, 1972.)*

Mathematical meteorological diffusion models simulate the process of pollutant mixing with the ambient air in simplified form. The diffusion model usually is based on an emission register of meteorological parameters which affect the dispersion of air pollutants in the atmosphere by either promoting or reducing the natural ventilation and on the mathematical meteorological description of the dispersion in the form of a diffusion equation (in the model of Bremen, the solution of the equation yields a Gaussian plume) with the meteorological factors of wind velocity and direction, turbulence, and temperature lapse rate and height of an inversion. Diffusion models furthermore take into account orographic conditions as well as a characterization of the chemical and physical processes during the dispersion process, e.g. chemical and photochemical conversion of air pollutants, and absorption and adsorption sedimendation due to the force of gravity. With these basic elements, a number of possibilities exist for the formulation of diffusion models. As a result, diffusion models yield concentration distributions dependent on the respective meteorological situation and the respective emission conditions. The developmental history of diffusion models represents a gradual refining process with application to increasingly complex and difficult problems. The diffusion models were expanded to include temporal changes of emissions, nonstationary dispersion processes, and nonuniform wind areas. Also, topographic factors and their influence on the dispersion process as well as the physics of the planetary boundary layer and the micrometeorology or an urban area are incorporated.

19815 APTIC NO. 37975

Huet, B. J.

ATMOSPHERIC POLLUTANTS AND URBAN BIOMETEOROLOGY. *(Les polluants atmospheriques et la biometeorologie urbaine). Text in French. Agressologie, 12(D):25-35, 1971. 16 refs.*

Particles of a diameter below 10 micron, between 10 and 75 micron, and above 75 micron have a life lasting from several seconds to several months. Particles smaller than 1 micron are created by condensation and combustion, larger particles by fragmentation. This meteorological effects influence insolation, which they can reduce by up to 30% in highly polluted areas. Particulate pollutants are detrimental to inert materials (direct and indirect corrosion), to plant life (coating of leaves and interception of sunlight), to humans (toxicity, respiration), and they also adsorb toxic substances. Thermal pollution can destroy aquatic vertebrates and thus disturb the ecosystem, in the atmosphere it causes fogs and creates air currents. Of chemical pollutants, sulfur dioxide corrodes inert materials, slows down plant growth, and interferes with the respiration of animals and man at a 1 ppm concentration acting for 30 min. Carbon monoxide is noxious because of its affinity for hemoglobin. Carbon dioxide, whose normal atmospheric concentration is 0.03%, has increased by 15% since the turn of the century; it absorbs long-wave infrared radiation, heats up the atmosphere, melts glaciers and raises the level of the seas. Countless other pollutants each have particular effects on urban biometeorology. The pathological effects of urban pollutants from domestic heating sources, from industries, and from automobiles can be potentiated by local climatic conditions. This interaction is due to the infrastructure (buildings, streets) and to urban activity. This results generally in an increase in atmospheric temperature which to a certain extent counterbalances the noxious effects of a stable polluted atmosphere and can even on occasion pierce by an updraft and atmospheric inversion. Pollutants themselves also have a direct meteorological effect: they form a screen which partly reflects and partly filters out sunlight with disturbing quantitative and qualitative consequences for the ecological equilibrium. To differentiate between phenomena occurring today on a regional scale and those which apply to the planet as a whole is illusory: the situation prevailing in cities today may prevail on the entire planet tomorrow.

19816 APTIC NO. 38436

Ide, Yasuo

THE EFFECT OF THE OBSERVATION TIME ON TURBULENT DIFFUSION IN THE ATMOSPHERE. *Water, Air, Soil Pollut., 1(1):32-41, Nov. 1971. 20 refs.*

Modern diffusion theory is briefly reviewed and the effect of the observation time on turbulent diffusion is considered. Where T is the traveling time, a plume becomes an instantaneous plume (s less than T), a steady plume (s greater than T), and a quasi-steady plume (s approximately equal to T) according to the length of the observation time, s. The instantaneous plume has the cuspidal and parabolic zone, the steady plume has the linear and parabolic zone, and the quasi-steady plume has the linear, cuspidal, and parabolic zone with an increase in T. The diffusivity coefficient increases with traveling time, proportionally to T in the linear zone and to T to the second power in the cuspidal zone, becoming constant in the parabolic zone. The diffusivity coefficient in the cuspidal zone is equivalent to Richardson s empirical law. Since the plume spreading angle depends on the observation time, air pollution engineers should make the observation time obvious in their estimation of the plume angle. (Author conclusions modified)

19817 APTIC NO. 37953

Jaskulla, N., W. Prietsch, and H. Torge

DISTRIBUTION LAWS OF AUTOMOBILE EXHAUST GASES IN THE FREE ATMOSPHERE AND IN RESIDENTIAL AREAS. *(Gesetzmaessigkeiten der Verteilung von Kraftfahrzeugabgasen in der freien Atmosphaere und in umbauten Raeumen). Text in German. Technik (Berlin), 27(1):41-47, Jan. 1972. 21 refs.*

A general mathematical analysis reveals that the pollutant concentration in the ambient air after the mixing process is influenced by the parameters of pollutant emission, total volume, air exchange, and time. With the help of measurement results concerning the carbon monoxide distribution in the free atmosphere, the expected emissions caused by the exhaust gases of automobiles for residential areas can be theoretically determined. It has been assumed that the distribution of all pollutants follows linearly the CO distribution. The influence of the wind velocity and the emission changes with the height above the ground were taken into consideration. According to the theoretical considerations, the relationship between emission and traffic density is directly proportional. Practical measurements of CO, nitrogen dioxide and hydrocarbons confirmed this finding. By including the wind velocity (multiple regression), a linear correlation between the atmospheric CO concentration and the traffic density was found. By comparison with measured data taken from the literature, the linear relationship between the CO distribution and the distribution of other pollutants (hydrocarbons and lead), assumed for the theoretical considerations, were confirmed.

19818 APTIC NO. 37769

Kocmond, W. C. and E. J. Mack

THE VERTICAL DISTRIBUTION OF CLOUD AND AITKEN NUCLEI DOWNWIND OF URBAN POLLUTION SOURCES. *J. Appl. Meteorol., 11(1):141, 148, Feb. 1972. 16 refs.*

Simultaneous airborne observations of Aitken and cloud nuclei upwind and downwind of Buffalo, N. Y., were made in an effort to determine the effects of air pollution on condensation nucleus concentration. Measurements of cloud nuclei were made with a thermal gradient diffusion chamber and, in addition to the cloud chamber, a small particle detector was used on board the aircraft to make measurements of total nucleus concentration at selected altitudes and locations. Significant increases over background concentrations were observed of both Aitken and cloud nuclei, with a secondary maximum in cloud nucleus concentration usually occurring about 10-15 miles farther downwind. In spite of these large increases in the total number of nuclei downwind of an industrial-urban complex such as the Niagara Frontier, the concentration of cloud and Aitken particulates approaches upwind background levels within 20-50 miles of the sources. Attempts to define the role of air pollution in cloud microstructure were confined to a single set of airborne observations. The limited drop-size distribution and cloud nucleus data were not sufficient to justify firm conclusions, and additional measurements are recommended. (Author abstract modified)

19819 APTIC NO. 37901

Kondratyev, K. Ya.

SPECTROPHOTOMETRY OF THE ENVIRONMENT FROM SPACE. *Naturwissenschaften (Berlin), 58(11):529-541, Nov. 1971. 20 refs.*

Visual observations of the Earth carried out by the cosmonauts produced voluminous data on the colorimetry of the planet and the optical structure of the horizon, and made it possible to follow such phenomena as the aurora and noctilucent clouds. Still more interesting results were obtained from spectrophotometric measurements of the brightness of the Earth s twilight aureole and of various natural formations. Measurements of the aureole brightness could help to solve the problem of investigating the aerosol pollution of the atmosphere. The influence of haze on spectral contrasts and the experimental determination of the atmospheric transfer function are considered. The spectrophotometry of natural formations opens up prospects for their identification from the reflection spectra. (Author abstract modified)

19820 APTIC NO. 38659

Kopczynski, Stanley L., William A. Lonneman, F. Dexter Sutterfield, and Paul E. Darley

PHOTOCHEMISTRY OF ATMOSPHERIC SAMPLES IN LOS ANGELES. *Environ. Sci. Technol., 6(4):342-347, April 1972. 12 refs.*

During the fall of 1968, samples of downtown Los Angeles air were collected in large plastic bags and irradiated with natural sunlight. The samples were analyzed periodically before and during irradiation for carbon 1 to carbon 10 hydrocarbons, nitric oxide, nitrogen dioxide, peroxyacetyl nitrate, total oxidant, and carbon monoxide. Reactivities of the samples were calculated, and the effects of sunlight intensity, temperature, and sample composition on reactivity were evaluated. Correlation of the rates of reaction of the individual hydrocarbons of these samples with rates reported for irradiated synthetic mixtures provides a validation of the irradiation chamber technique for studying atmospheric photochemistry. The samples, which were collected during morning traffic, closely resembled diluted auto exhaust mixed with light paraffins from natural gas and gasoline evaporative losses. There was a wide variation in ultraviolet light dosage from day to day with a resulting strong effect on degree of atmospheric reactivity and associated pollution manifestations. The effects of ultraviolet dosage were also studied by attenuating the sunlight with a screen. (Author abstract)

19821 APTIC NO. 37909

Koyama, Hiroaki and Hiromi Kanbe

DISCRIMINATIVE DETERMINATION OF STACK GAS BY TRACER GAS (VIII), SIMILARITY ON DIFFUSION BEHAVIOR OF STACK GAS AND TRACER GAS IN ATMOSPHERE. *(Gasu toresa ni yoru haigasu senbetsu sokutei (VIII), taikichu ni okeru haigasu to toresa gasu no doitsu kyodosei ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):75, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)*

In order to establish a selective determination method using tracer gases to quantitatively understand the diffusion behavior of stack gas an examination was performed to see if tracer gases and stack gas behave similarly, using SF6, Freon-12(CCl2F2), and Freor 13B1 (CBRF3) as tracer gases and sulfur dioxide in stack gas. Sulfur dioxide concentration was determined by rosaniline method and tracer gases were analyzed by gas chromatography with the low temperature adsorption method. Equivalent sulfur dioxide concentrations calculated from tracer gas concentration were compared with air quality measurements, at a point, in the area surrounded by equi-concentration lines, and on the axis of the smoke; they behaved similarly.

19822 APTIC NO. 38214

Leahey, Douglas M. and James P. Friend

A MODEL FOR PREDICTING THE DEPTH OF THE MIXING LAYER OVER AN URBAN HEAT ISLAND WITH APPLICATIONS TO NEW YORK CITY. *J. Appl. Meteorol., 10(6):1162-1173, Dec. 1971. 27 refs.*

Within the mixing layer over a city, pollutants tend to be homogeneously distributed in the vertical, and a means of predicting the depth of the mixing layer is therefore important for air pollution predictions. A simple advective thermodynamic model was used to predict to depth of this layer over the New York urban area for five early morning periods which were characterized by synoptic-scale inversions. In the model, the wind was assumed constant in time and space and the lapse rate within the mixing layer assumed to be adiabatic. The addition of two heat-sink terms to the model reduce the artificial heat available to the air and allow one to consider the effects of cooling downwind of an urban area. Their magnitude in this study was about 30% of the magnitude of the artificial heat release in the New York City region. Correlation coefficients between observed and predicted mixing depths for the five non-summer mornings were about 0.86. The intensity of inversions upwind of a city greatly influence the depth of the mixing layer. (Author abstract modified)

19823 APTIC NO. 38629

Lipeles, Martin and Norman Malmuth

ANALYTICAL STUDIES OF SIMPLIFIED PHOTOCHEMICAL SMOG KINETICS. *Environ. Sci. Technol., 6(4):360-365, April 1972. 8 refs.*

Analytical solutions were obtained for the relationships between pollutant concentrations in the Friedlander-Seinfeld simplified model of the kinetics of photochemical smog. Time was then related to the nitric oxide concentrations, and hence to the other reactants, by a quadrature. From these results, approximate representations for the temporal dependence of reactants were obtained for short and long times. Important dimensionless groupings were identified which control the buildup and rate of decay of reactants. Relaxation times to achieve a steady state were determined from these results. A criterion for nitrogen dioxide concentration to be a monotonic function of time was also established. Finally, results were presented for special values of the kinetic rate parameters. Comparisons were made between analytical results and numerical solutions. (Author abstract modified)

19824 APTIC NO. 37835

Mammarella, L. and A. L. Santi

EXHAUST POLLUTANT DIFFUSION COEFFICIENT DETERMINED IN OPEN ENVIRONMENTS. *(Modulo di diffusione di inquinanti veicolari in ambiente aperto). Text in Italian. Geofis. Meteorol., 20(3/4): 106-114, Aug. 1971. 28 refs.*

Aerosols emitted by vehicles travelling in an urban street characterized by massive traffic were sampled at different ground levels using an impaction sampler. Aerosol sampling as a characterization of automotive emissions was chosen to determine pollutant diffusion and particle size distribution. Small aerosols tended to rise and diffuse quickly. The diffusion and dilution of vehicle pollutants in one-way streets with high traffic density was, therefore, fairly quick. The advantages of equipping trucks and public transportation vehicles with exhaust systems on the vehicle top were discussed. Sampling methodology and results are considered.

19825 APTIC NO. 37951

Manier, Gerhard

THE DETERMINATION OF THE STACK HEIGHT WITH A VIEW TO AIR POLLUTION. THEORETICAL FOUNDATIONS OF NEW VDI GUIDELINE. *(Die Bestimmung von Schornsteinhoehen im Hinblick auf die Luftreinhaltung. Theoretische Grundlagen einer neuen VDI-Richtlinie). Text in German. VDI (Ver. Deut. Ingr.) Z. (Duesseldorf), 114(1):24, Jan. 1972.*

High stacks help to provide a uniform distribution of air pollutants in the atmosphere and prevent frequent excess of the limit concentrations on the ground. At the moment the minimum stack height is determined according to the guideline worked out in 1963. Improvements are now feasible; frequency distributions of the meteoroligical dispersion conditions can now be used. The new guideline will require the stack to be so high that a certain maximum allowable emission concentration is exceeded only during a certain number of hrs/yr. Part of this limit value is consumed by the background concentration. The calculation of the diagrams for the guideline is carried out in three steps. First, the maximum concentration for all possible combinations of emission data and dispersion conditions is calculated. Secondly the two dimensional frequency distribution of the meteorological dispersion conditions for as many stations in the Federal Republic of Germany as possible is determined. Thirdly, from the first and the second step, a frequency distribution of the maximum concentration for each station is obtained. From each frequency distribution, an admissible maximum concentration is selected. The latter supplies in connection with the emission data, the necessary numerical material for the diagrams. The frequency distribution of the meteorological dispersion conditions, and thus also the diagrams, will change from place to place.

19826 APTIC NO. 38585

Marquardt, Wolfgang and Peter Ihle

AEROSOL DEPOSITS ON WATER SURFACES. *(Die Ablagerung von Aerosolen auf Wasserflaechen). Text in German. In: Technik und Umweltschutz Luft-Wasser-Boden-Laerm. Kammer der Technik, Brennstofftechnische Gesellschaft in der Deutschen Demokratischen Republik (ed.), Leipzig, VEB Deutscher Verlag fuer Grundstoffindustrie, p. 48-60. 14 refs.*

Transport and deposition of aerosol particles on water surfaces were simulated in experiments with a fluorescent tracer. The aerosol, with a dominant particle diameter of 0.8 micron, was supplied by an ultrasonic aerosol generator. The source height was 3.5 m above water. The tracer concentrations in the air were determined on the lee side. The rate of deposition could be determined by measurements of the emission concentration and the amounts deposited at various distances from the source. Both emission concentrations and depositions decreased with increasing distance from the source of emission. The mean value of the rate of deposition for the tracer particles used was 0.97 cm/sec, with a standard deviation of + or 0.38 cm/sec. Horizontal wind velocities had no direct effect on the concentrations, just as the rate of deposition was not influenced by the distance from the source. A connection was found between the near-surface concentration and the deposition. The measurements were carried out in neutral to moderately stable temperature stratification. The deposition from low sources is only slightly influenced by weather conditions. The increase in the deposition in unstable and in different temperature stratifications may be less important than generally assumed.

19827 APTIC NO. 38173

McNesby, J. R., R. Byerly, Jr., D. Garvin, and R. Hampson

COLLECTION AND EVALUATION OF PHYSICO-CHEMICAL DATA FOR AIR POLLUTANTS. *Natl.*

Bur. Std. (U. S.) Tech. Note, no. 711:46-47, 73, Jan. 1972. 11 refs.

GPO: C 13.46:711

Data sheets, including photochemical and reaction rate data, on the physical and chemical properties of atmospheric pollutants are being compiled. Preliminary data sheets have been prepared for ozone, peroxyacetyl nitrate, and several other pollutants; sheets for oxygen and nitrogen dioxide are essentially complete. Work in progress includes the collection of relevant data on the possible effects of high-flying aircraft on the ozone layer of the atmosphere.

19828 APTIC NO. 38544

Miller, Henry Tyrus

THE ADSORPTION OF SULFUR DIOXIDE ON AIRBORNE PARTICULATE MATTER. *North Carolina Univ., Chapel Hill, Dept. of Environmental Sciences and Engineering, Thesis (Ph.D.), Ann Arbor, Mich., Univ. Microfilms, Inc., 1970, 246p., 96 refs.*

The possibility of synergism between gaseous and particulate pollutants has been suggested. The enhanced toxicity has been ascribed to the adsorption of gas on the surface of the particle. Adsorption of sulfur dioxide on particulates was studied. Reaction mechanisms and kinetics of particulate matter exposed in a polluted atmosphere consisting of 58% relative humidity and sulfur dioxide or in test atmospheres of dry air, SO2, and either nitrogen dioxide, carbon dioxide, carbon monoxide, or butene-1 were investigated. The design of the adsorption system is described; concentrations in the gas and adsorbed phases were assessed by gas detector calibration; the adsorbents tested were glass beads, fly ash, graphite powder, activated carbon, and zeolite catalyst in variations of particle size, bulk density, and amount of fine material. The statistical methodology is defined. The result of adding CO and butene-1 to the test atmosphere of air and SO2 was an increase in the removal of SO2. In the case of CO, a chemical reaction involving SO2, CO, water vapor, and other trace materials was suggested. The addition of NO2 resulted in the oxidation of SO2 by reaction products of the photochemistry of NO2. The addition of increased amounts of water vapor also increased yields of the oxidation reaction. The adsorbents used exhibited different surface characteristics and responses. The removal of SO2 from all test atmospheres increased with increasing concentration and surface area; the presence of contaminating gases in the test atmosphere usually increased SO2 removal. Most of the SO2 removal appeared to be either by chemisorption or by chemical reaction on the particle surfaces. Equations describing the removal of SO2 were used to estimate the increase in uptake of SO2 of a man exposed to 1 ppm SO2 and an aerosol; only microgram quantities of SO2 penetrated the lung due to aerosol exposure. (Author conclusions modified)

19829 APTIC NO. 37834

Montefinale, Alberto C., Tito Montefinale, and Henry M. Papee

RECENT ADVANCES IN THE CHEMISTRY AND PROPERTIES OF ATMOSPHERIC NUCLEANTS: A REVIEW. *Pure Appl. Geophys. (Basel), 91(8):171-210, 1971. 415 refs.*

Recent progress in the investigation of weather-active atmospheric nucleants is surveyed. Studies on condensation nuclei, with emphasis on Aitken nuclei, large nuclei, giant condensation nuclei and their role in nature, are reviewed. The nuclei of ice formation, with regard to the mechanisms of natural ice-forming nuclei, extra-terrestrial nuclei, and artificial nuclei, are examined. The induction, inhibition, and alteration of natural hydrometeor processes are discussed with respect to the role of condensation and ice-formaing nuclei and inadvertant weather modification.

19830 APTIC NO. 38387

Moureu, Henri

THE PHYSICO-CHEMICAL ASPECTS OF URBAN ATMOSPHERIC POLLUTION. *(Physico-chimie de la pollution des atmospheres urbaines). Text in French. Pollut. Atmos. (Paris), vol. 12:75-82, May 1970.*

Man-made air pollution affects the individual by its immediate toxicity, by its long-term cumulative effects, or by the aggressiveness of complexes resulting from physico-chemical changes in the lower atmosphere due to the interaction between solar radiation and the various pollutants. Two examples of the latter phenomenon are acid smog and oxidative smog. Acid smog results from the interaction of large volumes of combustion gases with winter fogs. A sulfuric acid aerosol forms in humid air with a concentration of 0.1 cu cm/cu m in summer and of 0.4 cu cm/cu m in winter. Two photochemical mechanisms are responsible for the transformation of sulfur dioxide to H2S04, one proceeding in the gaseous phase, the other proceeding in the liquid phase (fog droplets). Oxidative smog results from a simultaneous presence in the atmosphere of nitrogen oxides, ozone, and organic peroxides; t5he process has been duplicated in the laboratory by exposing a mixture of 0.4 ppm nitrogen dioxide, 0.2 ppm ozone, and 0.5 to 3 ppm hydrocarbons to irradiation by sunlight. This type of smog contained more than 60 organic compounds. In the presence of NO2, photochemical oxidation of a great number of organic compounds is accompanied by the formation of ozone. Up to 8 ppm 03 can form in 10 hr from 3 ppm 3-methylheptane and 1 ppm NO2. The mechanism of the photochemical oxidation of organic compounds involves photolysis of NO2 and the formation of free peroxidated radicals with NO2 playing the role of the photoinitiator or of a regenerable photoabsorber. In 1961 the peroxyacetyl nitrate (PAN) isolated in laboratory experiments and also detected in Los Angeles smog was found to play a role in the formation of the Los Angeles-type smog.

19831 APTIC NO. 37995

Nagata, Hisanori

FLUCTUATION OF CONCENTRATION OF SULFUR OXIDES IN AIR UNDER DIFFERENT TIME. *(Taiki chu iousankabutsu nodo no jikan henka). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):441, 1971.*

Estimation of sulfur oxides by the electric conductivity method was carried out for one year from April 1969 at the Kyoto Prefectural Institute of Public Health and the Kyoto Health Center in Kyoto Prefecture, to investigate the possibility of establishing a method of predicting sulfur oxides in air. Data were recorded 24 times a day every hour. As a result of the investigation concerning seasonal, weekly, and hourly fluctuations and regional characteristics of the concentration of sulfur oxides in the air, a certain pattern was observed in the average concentration of sulfur oxides by different times, weeks, and seasons. Significant correlation was found between the concentrations at two different times with considerably long intervals, concerning successively measured values.

19832 APTIC NO. 38288

Oya, Fumihiko and Shogo Ochiai

REGIONAL CHARACTERISTICS OF PHOTOCHEMICAL SMOG, ITS COUNTERMEASURE AND RESEARCH SYSTEM. *(Kokagaku sumoggu no chiiki tokusei to taisaku oyobi kenkyu taisei ni tsuite). Text in Japanese. Kogai Taisaku to Gyosei (Environ. Pollut. Countermeasure Adm.), 3(11):58-77, Nov. 1971.*

Photochemical smog incidents between May and Oct. 1971 in Kanagawa prefecture involved a total of 13,183 persons in eight cities. The time of occurrences was mostly between 12 noon and 3 pm, but some occurrences were noted about 9 am before heavy concentration of oxidant. Ninety percent of the victims were children of grade school and junior high school ages, followed by high school students. Most of the victims were in the playground rather than in the classrooms when the incidents occurred. Irritation of the eye and throat, tears, throat pain, chest pain, breathing difficulty, and headache were the main complaints. The climatic characteristics included less than 1000 m visibility at 9 am, less than 3 m/sec wind velocity, sunny or cloudy, highest temperature higher than 25 C, atmospheric stability MMD 1500 m with a wind velocity of 5 m/sec, and 3100 m with a wind velocity less than 10 m/sec. The geographic characteristics of the eight cities are their low locations at the foothills and valleys; they are all suburban cities away from the Tokyo-Yokohama industrial belt. In 1970, 50 air pollution monitoring stations were installed in Kanagawa prefecture, and two more were added in 1971. Measurement equipment for sulfur dioxide, suspended particulates, oxidant, nitrogen oxides, hydrocarbons, and carbon monoxide were provided. As part of the system, the first color television monitoring system in Japan was installed at the prefectural government building. A 300 mm color camera with a 360 degree rotation commands the view of the entire Yokohama-Kawasaki industrial area. The video tape apparatus records the date and time automatically.

19833 APTIC NO. 38042

Pasquill, F.

FACTORS DETERMINING POLLUTION FROM LOCAL SOURCES IN INDUSTRIAL AND URBAN AREAS.

Meteorol. Mag. (London), 101(1194):1-8, Jan. 1972. 15 refs.

Within 10 km of a pollutant source, the factor determining the concentration of contaminant gases and particles is usually the stage of general drift in the prevailing airstream with progressive spreading sideways and vertically. However, chemical and physical transformation in the airborne stage and removal from the atmosphere by various natural processes cannot be ignored and may sometimes be decisive. The general drift in the airstream introduces a particularly effective and direct dilution of the pollutant when, as is usual, this is emitted gradually. The other very important characteristic of the source is its elevation above the general ground level. Elevation is advantageous as long as the plume of pollution is not deflected downwards as a whole. For a given elevation of source, the distance at which pollution appears at ground level with maximum effect depends on the rate of vertical mixing and hence on the stability of the atmosphere. Wind speed determines the effective total height of an elevated plume. In a multiple-source situation, concentrations vary widly from position to position in the area and from time to time. Nevertheless, the concentration averaged over a long time and over the whole of the area may be predictable with some accuracy. Irregular terrain introduces important modification of the general drift of pollutants, as do buildings and light winds and calms. There is a need for the standardization of the practical systems for estimating and forecasting air pollution levels from emission and meteorological data. Other needs are the provision of measurements capable of prescribing the general mixing depth plus the extension of the climatology of mixing depth and stability categories and improvement of the understanding and representation of the chemical transformation and natural removal of air pollutants.

19834 APTIC NO. 38530

Pisani, Francesco

ON SOME MATHEMATICAL MODELS USED IN AIR POLLUTION STUDIES.

(Su alcuni modelli matematici per lo studio dell inquinamento atmosferico). Text in Italian. Termotecnica (Milan), 25(12):634-642, Dec. 1971. 28 refs. (Presented at the National ATI Congress, 25th, Trieste, Sept. 1970.)

Knowledge of air pollution dynamics may provide means for its abatement at various levels including simple forecasting of specific air pollution conditions up to planning of urban development. The main features of mathematical modeling applied in mathematical aspects, their application to empirical data, and the use of computers in the processing of mathematical data. Discrepancies between theory and practice and specific diffusion models for large areas, derived from the generalized Gaussian diffusion equation are discussed. Included are critical analyses of the Miller-Holzworth, Clarke, Jacksonville, Washington Boston, and simplified Johnston models. Best results can be obtained with models generated by association of theoretical assumptions with their adaptation to experimental data.

19835 APTIC NO. 38610

Rikhter, L. A. and V. I. Kormilitsyn

MODELING OF AIR POLLUTANT DIFFUSION FROM THERMOELECTRIC POWER PLANT STACKS. (POINT SOURCE IN A TURBULENT FLOW).

(Modelirovanie rasprostraneniya vrednostey iz dymovykh trub TES (tochechnyy istochnik v turbulentnom potoke)). Text in Russian. Energetik. Moscow, no. 10:70-76, 1971. 8 refs.

The determination of the required stack height is based on the theory of diffusions in ground layers. Since stack smoke diffusions are determined by many factors, a simplified elementary scheme should be applied for modeling purposes, excluding a great number of factors that are to be considered subsequently. The investigations apply for non-depositing pollutants continuously supplied by stacks in turbulent flow. Integral equations are given for atmospheric diffusion. The coefficients of turbulent diffusion vary from 0.2 to 10 to the 12th power sq cm/sec. Wind tunnel tests were carried out in modeling turbulent flow from continuous point source with uniform horizontal air flow, and uniform vertical temperature and speed distribution. Contaminants assumed to be passive were investigated in the diffusion processes in isotropic turbulent flow. Air speed and temperature, temperature field, and source temperature were measured. Emission temperature was equal to the temperature of the main flow. The smoke flare angle was found to be constant for different main flow speeds. The maximum surface-layer concentration is given as a function of the effective stack height (xk equals 46H).

19836 APTIC NO. 38684

Schack, Alfred

THE EFFECT OF THE CARBON DIOXIDE CONTENT OF THE ATMOSPHERE ON THE WORLD CLIMATE.

(Der Einfluss de Kohlendioxid-Gehaltes der Luft auf das Klima der Welt). Text in German. Phys. Bl., 28(1):26-28, Jan. 1972. 1 ref.

It is widely believed that the carbon dioxide content of the atmosphere has a substantial influence on the world climate, since CO2 both permits complete passage of solar radiation and absorbs part of the heat transmitted from the surface of the earth into space, due to the greater wavelength of this heat radiation. On this basis, a gradual rise of average temperatures on the earth would have to be expected in the course of time, since the CO2 content of the atmosphere is steadily increasing in proportion to the growing use of fossil fuels, i.e., coal, oil, and natural gas. A critical mathematical analysis, based on Planck's radiation formula, indicates that even if the present CO2 content of about 0.03% of the volume of the atmosphere doubled, the extent of absorption of heat by CO2 would increase only negligibly. Carbon dioxide actually absorbs only about 14% of the total heat radiation from the earth surface, whereas the water vapor in the atmosphere, in the case of maximum humidity, absorbs up to 60%. If such a humidity condition occurs, heat absorption by water vapor overlaps the absorptive action of the CO2. The latter mechanism thus becomes fully effective in dry weather only.

19837 APTIC NO. 38539

Selezneva, E. S. and R. F. Lavrinenko

THE SIGNIFICANCE OF MEASUREMENTS OF PH AND ELECTRICAL CONDUCTIVITY IN INVESTIGA-

TIONS OF CHEMICAL COMPOSITION OF PRECIPITATION. *Idojaras (Budapest), 75(5/6):288-293, Sept./Dec. 1971. 11 refs. (Presented at the Hungarian Meteorological Society, Seminar on Atmospheric Chemistry, July 7, 1971.)*

The pH and specific electrical conductivity of precipitation samples must be measured, as well as the concentration of principle ions, if reliable results are to be obtained. There is a direct relationship between the sum of ions in precipitation and specific conductivity and a linear relationship between mineralization in precipitation and electrical conductivity. The degree of mineralization can be estimated on the basis of pH and electrical conductivity. At pH less than 5.0, hydrogen ions play an important part in the formation of the total conductivity due to their high mobility. Thus it is also necessary to take into account the value of pH. Twenty percent of the precipitation samples collected in Leningrad had a pH of 5.5-5.8, low electrical conductivity and, accordingly, little mineralization. A large part of the samples (about 75% in summer and about 40% in winter) were of the acid type with pH values of 4.0-5.5. The acid nature of the precipitation was due to the absorption of sulfur dioxide. When acid and alakli components are present in the atmosphere together, precipitation can be weakly acid, neutral, or alkaline, depending on the retention of the soluble part of these components. When solid particles are the main pollutants, pH increases to seven and beyond. Such precipitation has high general mineralization and correspondingly large electrical conductivity.

19838 APTIC NO. 38577

Shanks, S. G., W. A. Cole, A. Boyer, and D. G. Cooper

A WORKING SYSTEM FOR THE MANAGEMENT OF EMISSION INVENTORY INFORMATION. *J. Air Pollution Control Assoc., 22(2):85-89, Feb. 1972. (Presented at the Air Pollution Control Association, Annual Meeting, 64th, Atlantic City, N. J., Paper 71-10.)*

Emission inventory data collected in the metropolitan Toronto area (1969-1970) are managed by a computerized information system which abstracts specific information about individual sources for a diffusion model and also summarizes data in usable formats needed for the day-to-day operations of the Air Management Branch, Province of Ontario. Provisions are included for maintaining the data in a current state and modifying either specific sources or classes of sources for simulation purposes. The computer system utilizes COBAL programming routines but has the capacity to format data for the FORTRAN IV language used by the diffusion model. Emission inventory information includes seasonal, daily, and hourly emission rates for area and point sources plus exit gas velocity from stacks and control equipment efficiency. Three summary extracts are regularly prepared: emission quantity summary by size of contribution; emission quantity summary by source type; and sources by type of control equipment installed. The diffusion model predicts air quality on an hourly basis. Major sources include motor vehicles, domestic heating, industrial sources, shipping, railroads, and aircraft.

19839 APTIC NO. 38683

Shinra, Koichiro

DISPERSION CALCULATION OF SMOKE FROM SURFACE EMISSION SOURCES. *(Mengen kara no kemuri no kakusan keisan). Text in Japanese. Kankyo Gijutsu (Environ. Conserv. Eng.), 1(1):23-26, Jan. 1972.*

Formulas for calculating dispersion of smoke emitted from ground level sources are used to calculate the smoke concentration distribution pattern for a large area. An area is divided into segments of 2 sq km, and the numbers of three classes of stacks lower than 15 m, 15 to 45 m, and higher than 45 m are determined for each. The annual or seasonal stack gas emission rate (mg/sec/sq m) of each category of stack is calculated. Emission rates, mean wind velocity, wind direction frequency, and mean wind velocity of a given wind direction are taken into consideration. For calculating the annual average ground concentration of sulfur dioxide in 1969 for various areas of Osaka prefecture, data were obtained from local emission measurements, ground surface calculation formulas, and weather data from thermal electric power plants. Adjustments were made by the Holland formula for very high stacks. In general, the calculated figures were higher than actual measurements along the shoreline areas. Further examination is necessary for determination of the mean wind velocity to be used for these calculations.

19840 APTIC NO. 38406

Sinclair, David

PHYSICAL PROPERTIES OF AEROSOLS. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 169 - 181. 36 refs. (May 3-5, Louis C. McCabe, ed.)*

The internal stability (coagulation and gravity settling) of an aerosol is primarily dependent on the concentration, which determines the coagulation rate, and the particle size, which determines the settling rate. A typical smog containing 10,000 particles/cc of 0.15 micron radius will settle under gravity at the rate of about 2 cm/hr and coagulate due to Brownian movement at the initial rate of about 1% hr; such an aerosol is comparatively stable in relation to aerosols produced in confined spaces such as a laboratory or plant. Theoretical aspects of Brownian movement, gravity settling, and of coagulation and gravity settling combined are discussed. Total light scattering and angular distribution in aerosols are described with reference to optical methods of measuring aerosol particle size and concentration. The results of calculations made to determine the angular positions of plane polarized scattered light are given; these positions might be used as a measure of particle radius greater than about 0.15 micron, using approximately monochromatic light.

19841 APTIC NO. 37818

Singer, S. Fred

STRATOSPHERIC WATER VAPOUR INCREASE DUE TO HUMAN ACTIVITIES. *Nature (London), 233(5321):543-545, Oct. 22, 1971. 35 refs.*

While great interest has been aroused by the possibility that a fleet of supersonic transports flying in the stratosphere would deposit sufficient water vapor to increase the average global concentration by about 7%, from 3 ppm to 3.2 ppm, it is suggested that methane production may be a more important cause of an increased water vapor content than the SST. Methane is injected into the atmosphere mostly from the decomposition of organic matter at the Earth s surface, from swampy areas, rice paddies, geothermal areas, coal fields, natural gas and petroleum wells, and industrial centers. A large fraction, perhaps as much as 50%, of the methane production is related to human activities; it is therefore growing at a rate of about 2-3% a year. An interpretation of the observed rapid decrease in the methane mixing ratio, which begins at the tropopause, is that methane moves into the stratosphere from below, and is therefore chiefly oxidized into water vapor. The methane source has a more significant effect on the stratospheric ozone concentration than does the water vapor injected directly from the troposphere or from prospective SSTs. This is because atomic oxygen plays an important role in the oxidation of methane, and is therefore removed and made unavailable for ozone production.

19842 APTIC NO. 37768

Skibin, D.

DIRECT DETERMINATION OF ATMOSPHERIC TURBULENCE AND DISPERSION PARAMETERS. *J. Appl. Meteorol., 11(1):85-89, Feb. 1972. 17 refs.*

A formula is presented for the frequency distribution function of wind direction, having a lateral intensity of turbulence. In the case of an emergency release of pollutants to the atmosphere, the determination of the concentration distribution function of the pollutant is important. A simple set-up is described which measures the relative frequency of electrical dc output voltages. An excellant approximation for the frequency distribution fuction of wind direction is obtained by using this set-up for the measurement of the output of a wind vane. Comparison of the theoretical and experimental measurements of the frequency distribution function of the wind direction enables one to obtain the lateral intensity of turbulence. Sampling duration and averaging time can be arbitrarily chosen or changed, thus giving an expression which defines the lateral dispersion coefficient, according to Pasquil s theory. (Author abstract modified)

19843 APTIC NO. 37811

Spirina, L. P.

ON EFFECT OF VOLCANIC DUST UPON THE TEMPERATURE REGIME OF THE NORTHERN HEMISPHERE. *(O vliyanii vulkanicheskoy pyli na temperaturnyy rezhim Severnogo polushariya). Text in Russian. Meteorol. i Gidrol., no. 10:38-45, Oct. 1971. 8 refs.*

On the basis of climatic studies, the effects of powerful volcanic eruptions on the temperature regime of the Northern Hemisphere were investigated. The effects of volcanic dust on the temperature regime are shown by air temperature anomalies caused by four powerful eruptions. In summer, the cooling effect increases from lower to higher latitudes, while it is manifest from the 75 northern latitude only in winter. Temperature rises are observed on the rest of the hemisphere. Between 20 and 70 Northern latitudes, general temperature drops can be observed in summer. In winter, the cooling effect in the high latitudes is compensated for by temperature rises in medium latitudes. These phenomena result in a global temperature rise for the total hemisphere following eruptions. Temperature anomalies showing averages for 5 yrs before, during, and following eruptions are plotted. Irrespective of the character and site of the eruption, volcanic dust has a serious disturbing effect on the temperature field in winter, causing intense temperature rise in temperate latitudes, and important cooling in polar areas. The intensification of the West-East transfer is a possibility. The disturbing effects are mainfest for about 5 yrs, followed by 5 more yrs of relaxation. Differential charts show yearly temperature variations and the action radius.

19844 APTIC NO. 38627

Steinberger, Warren

GRAPHICAL DETERMINATION OF POLLUTION PROBLEMS. *Pollut. Eng., 4(2):41-42, March/April 1972.*

A method for the graphical display of air pollution data is reviewed. A series of displays were developed to present some of the relationships between such factors as pollutant source distribution, population densities, pollutant concentrations, monitoring site locations, population-dose exposure, and meteorological factors. The overlays are designed to be placed over a base map. This type of display is more informative to a wider range of persons than statistical tables or tabulations of figures.

19845 APTIC NO. 38196

Stubbe, P.

THE INFLUENCE OF NEUTRAL WINDS ON THE NO+ AND 02+ DENSITIES IN THE LOWER IONOSPHERE AT NIGHT. *J. Atmospheric Terrest. Phys., 34(3):519-523, March 1972. 9 refs.*

A simultaneous solution of the time dependent coupled electron-ion continuity equations, electron-ion equations of motion, and the neutral gas equation of motion indicate that neutral winds can influence the behavior of the nighttime lower ionosphere, particularly with respect to the electron and nitric oxide and oxygen ion density valley above about 130-140 km.

19846 APTIC NO. 38693

Telford, James W.

A PLUME THEORY FOR CONVECTIVE FIELD IN CLEAR AIR. *J. Atmospheric Sci., 29(1):128-134, Jan. 1972. 7 refs.*

The equation for a field of convective plumes, derived from a model which included turbulence as an independent property with a specific kinetic energy, are non-dimensionalized, and the numerical solutions are extended to cover all conditions. The field consists of plumes rising to a level where the stability of the overlying air forces the air to turn about and descend between the plumes to the surface. The model uses the flux, the layer depth, and the surface turbulence intensity (rms turbulent velocity) as parameters and does not include the wind specifically. There is likely to be a limit to the maximum depth of the layer, and a different form of convection may be expected when heating continues after this depth is reached. The variation in depth is discussed in terms of changing surface turbulence and heat flux or rate of temperature increases. (Author abstract modified)

19847 APTIC NO. 38353

Thuillier, Richard H. and James S. Sandberg

DEVEOPMENT OF A METEOROLOGICALLY CONTROLLED AGRICULTURAL BURNING PROGRAM. *Bull. Am. Meteorol. Soc., 52(12):1193-1200, Dec. 1971. 8 refs.*

An analysis of data from four seasons of agricultural burning in the San Francisco Bay Area demonstrated both the feasibility and the value of a meteorologically controlled burning program. Under this program, burning is prohibited in the presence of a temperature inversion below 2500 ft. If the morning sounding shows no inversion below 2500 ft, or if surface temperatures will have caused vertical mixing up to 2500 ft, then burning is permitted. In addition, local wind speed should exceed 5 mph. Based on the pollution potential indicated by readily accessible meteorological data, a burn or no-burn decision is issued by meteorologists prior to 0830 PST. The effectiveness of the program was verified by a combined pollutant index. Of the days for which permission to burn was given, 99.5% experienced pollutant levels in the light air pollution or clean air categories. In the case of no-burn days 15.1% experienced moderate air pollution or worse, and only 8.5% experienced clean air. The effectiveness of using minimum temperature as a forecast tool (to parameterize local stabilization due to nighttime cooling) will be tested in the next burning season.

19848 APTIC NO. 37978

Tsang, Gee

ENTRAINMENT OF AMBIENT FLUID BY TWO-DIMENSIONAL STARTING PLUMES AND THERMALS. *Atmos. Environ., 6(2):123-132, Feb. 1972. 3 refs.*

The rate of entrainment of ambient fluid by plumes and thermals is important because the rate of reduction of buoyancy and the rate of reduction in concentration of pollutants in a starting plume and a thermal are directly affected. Based on flow patterns from laboratory experiments, the distribution of entrainment velocity along the boundary of two-dimensional starting plumes and thermals was computed. The rate of total ambient entrainment was also derived. For a two-dimensional starting plume, high entrainment of ambient fluid occurs in the front and at the back of the cap near the joining point of the tail to the cap. The rate of entrainment in the region immediately behind the point of maximum width is about zero. The mean concentration of a pollutant in the starting plume is inversely proportional to the linear size of the plume. For a two-dimensional thermal, high rate of ambient entrainment occurs in the front slightly off the center line and at the rear close to the center line. Based on the rate of ambient entrainment, the rate of dilution of pollutants in two-dimensional starting plumes and thermals may be calculated. (Author conclusions modified)

19849 APTIC NO. 38131

Val nikov, I. U.

AMOUNT OF SULFUR DEPOSITING ON THE EARTH S SURFACE WITH THE ATMOSPHERIC PRECIPITATION IN THE TARTAR SSR. *(Kolichestvo sery, postupayushcheye na zemnuyu poverkhnist s atmosfernymi osadkami v uslovayakh Tatarskoy ASSP). Text in Russian. Biol. Nauki, 14(10):110-111, 1971. 10 refs.*

Atmospheric precipitation at various points in the Tatar SSR averaged 411-450 mm over 5-month periods; the average sulfur content of the precipitations varied from 2.16-8.45 mg/l and from 4.50-16.33 kg/ha. Sulfur concentrations were higher in samples taken close to industrial centers and higher in winter than in summer.

19850 APTIC NO. 38608

Wachter, Heinz

CLIMATIC PROBLEMS OF AIR POLLUTION. *(Klimatische Probleme der Luftverschmutzung). Text in German. VDI (Ver. Deut. Ingr.) Z. (Duesseldorf), 114(4):225-231, March 1972. 10 refs.*

Climate and air pollution influence each other mutually. The dispersion of air polluting substances depends on meteorological conditions, on the other hand, the increase of the carbon dioxide concentrations caused by the actions of man influence the climate. The CO2 background concentration of the atmosphere was about 300 ppm. Beginning with the second half of the last century, the CO2 emissions by combustion processes of mostly fossil fuels increased so much that the CO2 concentration of the air rose by about 1/10 of the former amount and further rises annually by about 0.7 ppm. It is expected that by the year 2000, the CO2 concentration will have reached 375 ppm. This rise of the CO2 concentration is worldwide and was even measured on Hawaii. Also, the dust concentration of the atmosphere is rising. It has been assumed that the rise of the CO2 concentration causes a general temperature increase, but the temperature increase of the first half of this century has come to a halt. Other pollutants which deserve mentioning ar sulfur dioxide and carbon monoxide because they are so toxic. Various processes such as rainout, washout, absorption, and reaction with the top soil remove the SO2 again. Airplanes carry air pollutants up into the stratosphere. In large urban areas air pollution has lead to markedly different climatic conditions than in the surrounding non-urbanized areas. The temperatures are usually higher, solar radiation is different (usually lower), and the shower actitivity may be higher. In conclusion, it must be said that the combustion of fossil fuels may also eventually reduce the oxygen supply of the atmosphere. According to calculations, the combustion processes of the last 50 yrs have reduced the oxygen supply by 0.02%, according to other calculations by 0.7%.

19851 APTIC NO. 38222

Yeaple, Donald S.

MERCURY IN BRYOPHYTES (MOSS). *Nature (London), 235(5335):229-230, Jan. 28, 1972. 6 refs.*

The potential application of mosses as indicators of the transport of mercury through the environment was investigated. Moss samples were collected within an 80-mile radius of Boston, along the Maine coast, near the tops of Mount Katahdin in Maine and Mount Washington in New Hampshire, and from Walden, New York (60 mi north of New York City). The samples were wet ashed in a concentrated nitric acid/sulfuric acid/potassium persulfate digestion procedure: total mercury was determined by flameless atomic absorption sepctrophotometry. Mercury levels in the Boston area ranged from 250 ppb in a residential suburb to 1450 ppb in Cambridge. The Walden sample showed 2000 ppb mercury. Relatively high readings were also recorded for three New Hampshire towns with some industrial activity and moderate population. The mountain samples showed low concentrations as did three of four samples from the Maine coast; the fourth coastal sample (566 ppb) was taken near a large cement plant. If mercury is being accumulated as a result of fossil fuel combustion, the relative importance of industrial activity to home heating will have to be determined.

BASIC SCIENCE AND TECHNOLOGY

19852 APTIC NO. 38025

Bubert, H.

POPULATION AND PREDISSOCIATION OF VIBRONIC STATES OF NITRIC OXIDE. *J. Chem. Phys., 56(3):1113-1116, Feb. 1, 1972. 12 refs.*

Nitric oxide was excited by the crossed beam technique to obtain the gamma bands emitted from the primary excited vibration levels. Based on the observed emission of the gamma bands, the mean electronic transition moment and the population of the vibration levels upsilon equals 0, upsilon equals 1, and upsilon equals 2 of the A2Sigma+ state were determined. The population numbers are compared with values calculated from kinetic equations and relative rate constants are given corresponding to transitions in the D2Sigma+ state. The constants show that a predissociation occurs in the D2Sigma+, upsilon equals 2 state. (Author abstract modified)

19853 APTIC NO. 38631

Frankiewicz, Theodore and R. Stephen Berry

SINGLET 02 PRODUCTION FROM PHOTOEXCITED NO2. *Environ. Sci. Technol., 6(4):365-366, April 1972. 16 refs.*

When mixtures of nitrogen dioxide and molecular oxygen were irradiated with visible light, electronically excited NO2 was produced which transferred energy collisionally to O2 to produce singlet oxygen. The population of singlet oxygen in the reaction cell was determined by monitoring its phosphorescent emission at 1.27 micron with a photomultiplier used in a photon counting mode. From the experimentally determined rate of production and destruction of singlet oxygen, the probability that a quenching collision of NO2 with 02 will produce singlet oxygen is alpha equal to 0.01 plus or minus 0.002. This mechanism is capable of producing a steady-state singlet oxygen concentration in the atmosphere of 10 to the 7th power to 10 to the 8th power/cu cm. (Author abstract modified)

19854 APTIC NO. 37787

Goetz, A., J. P. Lodge, Jr., Gladys Sturdy, O. D. Austin, and D. C. Sheesley

NUCLEATED PHOTOCHEMICAL AEROSOL FORMATION. *Idojaras (Budapest), 75(5/6):280-287, Sept./Dec. 1971. 11 refs. (Presented at the Hungarian Meteorological Society Seminar on Atmospheric Chemistry, July 23, 1971.)*

Goetz and Kallai have described a dynamic apparatus for the production of photochemical aerosol from olefins, nitrogen oxides, and a suitable defined nucleating aerosol. Results with the system have been acceptable, but the treatment of the data to date has been essentially quantitative. A series of experiments designed to analyze the system by statistical means are presented. The apparatus included an aerosol spectrometer and a light-scattering photometer. Complete analysis results are tabulated. In accordance with the claims of the apparatus, latex concentration was relatively unimportant; although statistically significant as a variable, its actual effect was never more than a few numbers in the third significant figure. Particle growth was, to a first approximation, linear in the gaseous reactants and independent of latex nucleus concentration.

19855 APTIC NO. 38368

Haertel, Otto and Sieglinde Miklau

A METHOD FOR OBTAINING DEFINED LOW SO2 VOLTAGES. *(Eine Methode zur Herstellung definierter niedriger SO2-Spannungen). Text in German. Pflanzenkrankheit., 78(9):538-543, Sept. 1971. 11 refs.*

A method is described for gasification of plants with defined quantities of sulfur dioxide. It is based on the equilibrium of SO2 between solutions of sodium bisulfite of various concentrations and air. The partial pressure of SO2 in air produces a definite equilibrium with aqua distillata. The experimental set-up for exposure of plants to SO2 is quite simple. In a flat vessel of glass, with an even bottom, two small dishes are set up. One is supplied with sodium sulfite solution, the other with aqua distillate. A glass bell is placed over the two dishes and sealed with plasticine at the bottom. A constant temperature is maintained. Within a few minutes a certain SO2 partial pressure is obtained which depends on the NaHSO3 solution and on the temperature. After some time a constant and defined SO2 or sulfurous acid content in the dish filled with water is obtained. In the set-up plants can be gassed or cuts can be treated with the H2SO3 solution. With the latter, the SO2 concentration in the air in the course of fumigation experiments can be determined.

19856 APTIC NO. 38536

Karpov. L. G., A. M. Pravilov, and F. I. Vilesov

PHOTOCHEMICAL EQUILIBRIUM DURING THE PHOTOLYSIS OF OXYGEN AND MIXTURES OF OXYGEN WITH HELIUM, ARGON, XENON, NITROGEN, AND CARBON DIOXIDE IN THE LAMBDA GREATER THAN 155 A SPECTRAL REGION. *(Fotokhimicheskoye ravnovesiye pri fotolize O2 i smesi O2 + M B spektral noy oblasti Lambda bolshe 1550 A; M = He, Ar, Xe, N2, CO2). Text in Russian. Khim. Vysokikh Energiy, 5(6):483-486, 1971. 9 refs.*

The effects of dark loss of ozone on the walls and the photolysis of ozone in the photolysis of oxygen on the steady-state concentration of O2(O3)st were studied, i.e., the concentration of O3 under photochemical equilibrium conditions. In the absence of photolysis and O3 loss on the walls at O2 pressure equal to or greater than 20 torr, the value of O3)st(O2)2 equals 4-8 times 10 to the minus 20th power/cu cm equal to concentration, and the value of (O3)st is determined by the competition of the reactions of O (2P) with O2 and O3. The effect of helium, argon, xenon, carbon dioxide, and nitrogen as third body on O2 formation was determined.

19857 APTIC NO. 37830

McFarland, M., D. B. Dunkin, F. C. Fehsenfeld, A. L. Schmeltekopf, and E. D. Ferguson

COLLISIONAL DETACHMENT STUDIES OF NO-. *J. Chem. Phys., 56(5):2358- 2364, March 1, 1972. 30 refs.*

Rate constants for collisional detachment of the negatively charged nitric oxide ion were measured from 193 to 506 K. The ability to measure NO(-) reactions in a flowing afterglow experiment, which is a relatively high pressure experiment, depends on the existence of some buffer gas in which NO(-) is not too readily detached. Having produced a readily detactable NO(-) concentration in the argon buffer, the detachment experiments were straightforward. The reactant X was added downstream in measured quantities, and the rate of disappearance of NO(-) as a function of X yields directly a rate constant for the reaction of NO(-) plus X to yield NO plus X plus e. Helium, neon, hydrogen, nitric oxide, carbon monoxide, nitrous oxide, and ammonia were substituted for X. The data fit Arrhenius plots. From equilibrium considerations, electron attachment rates to NO were calculated. An estimate for the electron affinity of nitrogen trioxide is obtained from some auxiliary considerations. Rate constants for the charge-transfer reactions of NO(-) with oxygen and nitrogen dioxide were found to be 5 and 7.4 times 10 to the minus 10th power cu cm/sec, respectively. (Author abstract modified)

19858 APTIC NO. 38171

McNesby, J. R., R. Byerly, Jr., Richard Keller, Christer Hellner, and Allan Laufer

THE ROLE OF THE LOWEST EXCITED METASTABLE STATE OF SO2 IN THE PHOTOCHEMICAL PRODUCTION OF AIR POLLUTANTS. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:41-45, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

Flash irradiation in the ultraviolet of sulfur dioxide resulted in a metastable species with an absorption spectrum between 300-360 nm. The species had a long lifetime, did not react with common atmospheric species, and decayed to ground-state SO2. The long lifetime and the pressure dependence of the lifetime indicated that the species was not an excited electronic state of SO2. Other possibilities are isomeric species of SO2 or complexes formed between excited SO2 molecules or between an excited SO2 molecule and a ground-state molecule. The flash photolysis of SO2 resulted in the disappearance of the characteristic spectrum of ground state SO2.

19859 APTIC NO. 38172

McNesby, J. R., R. Byerly, Jr., J. T. Herron, and R. E. Huie

AIR POLLUTION CHEMISTRY. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:48-50, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

Absolute photochemical rate constants are being established for key reactions in air pollution chemistry. Rate measurements have been completed for the reaction of atomic oxygen with ethylene, cycloalkanes, and 1-butene. Nearing completion is work on the haloalkenes, higher olefins, oxygen, and nitrogen dioxide. Rate constants were also obtained for singlet molecular oxygen reactions at 0.5-8 torr. No evidence of a pressure effect was found, which suggest that relative raw data obtained from solution studies is transferable to real atmospheric situations. Singlet molecular oxygen was effectively titrated in 2,5-dimethylfuran, but not in tetramethylethylene or N,N-dimethylisobutenylamine.

19860 APTIC NO. 38177

McNesby, J. R., R. Byerly, Jr., and Ralph Klein

FIELD EMISSION SPECTROSCOPY. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:59-60, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

The behavior of nitric oxide adsorbed on ruthenium was studied by field emission spectroscopy by centering a field emission tip of ruthenium in a molecular beam of NO. Initial condensation at a ruthenium tip temperature of 4.2K was by way of chemisorption. Completion of the monolayer was followed by physical adsorption. Heating of the tip to 50-60 K resulted in the migration of the physi-sorbed layer to the underside of the tip where it was immediately trapped and chemisorbed. In this way, a tip covered with a monolayer of the gas was prepared; however, even after long deposition, no migration of NO to the unexposed portion was observed after heating. Heating of the half-covered tip to 300 K caused decomposition.

19861 APTIC NO. 38023

Michels, H. H.

CALCULATION OF THE INTEGRATED BAND INTENSITIES OF NO. *J. Quant. Spectr. Radiative Transfer, 11(11):1735-1739, 1971. 21 refs.*

The integrated intensities for the 5.3-micron fundamental vibration-rotation band and for the first and second overtone bands of nitric oxide were calculated within a quantum-mechanical framework. The dipole moment of NO was determined over a wide range of internuclear separations as an expectation value calculated with an accurate configuration-interaction electronic wavefunction and, in part, from experimental data. The calculated value for the 5.3-micron fundamental band is 134 plus or minus 2 sq cm/atm at standard temperature and pressure. Experimentally determined integrated band intensities are listed together with the results of a previous theoretical study. (Author abstract modified)

19862 APTIC NO. 38245

Pogrebnaya, V. L., A. V. Baranov, and L. A. Boychuk

KINETICS OF SULFUR DIOXIDE OXIDATION WITH A VANADIUM PENTOXIDE SUSPENSION IN SULFURIC ACID. *(K voprosu o kinetike okisleniya sernistogo gaza suspenziey pyatiokisi vanadiya v sernoy kislote). Text in Russian. Khim. Khim. Tekhnol., 14(9):1382-1385, Sept. 1971. 6 refs.*

The kinetics of sulfur dioxide oxidation were studied in a thermostatically controlled reactor equipped with an agitator. The vanadium pentoxide added was 1% by weight of the sulfuric acid. The reaction took place in the kinetic range under constant pressure. The sulfur dioxide was able to regenerate the vanadium pentoxide. The maximum reaction speed was obtained for a suspension prepared with 10% sulfuric acid. Kinetic curves and corresponding semi-logarithmic anamorphoses are given. The effect of different temperatures (5, 10, 16, 20, 25, 30, 40, and 50 C) on the reaction speed was investigated. The respective speed constants were found to be 0.117, 0.130, 0.137, 0.129, 0.125, 0.115, 0.1, and 0.075/min. The speed constant decreased in its absolute value starting from 16 C, i.e., the temperature coefficient of the reaction became negative. The calculated activation energy was 3197 cal/mol. The speed constants calculated for different concentrations of the sulfuric acid were nearly the same (0.125/min) in a temperature range of 20-25 C.

19863 APTIC NO. 38533

Schild, Hans-Juergen

THE INFLUENCE OF CARBON TETRACHLORIDE ON THE DISCHARGING BEHAVIOR IN AIR IN THE INHOMOGENEOUS ELECTRIC FIELD. *(Der Einfluss von Tetrachlorkohlenstoff auf das Entladungsverhalten in Luft im inhomogenen elektrischen Feld). Text in German. Elektrotech. Z. A, 93(2):112-114, Feb. 1972. 5 refs.*

The influence of carbon tetrachloride on the discharging behavior in air in the negative field of a spark gap between a point and a plate at dc voltage was studied. The arithmetic mean of the preliminary discharging current was measured. Simultaneously the temporal characteristic of the current was recorded with an oscillograph. The CC14 was injected with a nozzle perpendicularly to the center line between the electrodes. Between nozzle and center line a distance of 15 mm was maintained. The gas flow was directed to the point electrode. A reduction of the arithmetic mean of the preliminary discharging current was observed. Measurements in a frigen-air mixture yielded the same result. An inhomogeneous discharge path is influenced only by an additional gas when the negative gas molecules reach the ionizing zone. There they prevent the discharging and cause a reduction of the current impulses observed in air. At a larger electrode distance marked filamentary discharge currents develop. They initiate the break-through of the inhomogeneous discharging path at voltages which are not larger than those in a set-up with clean air.

19864 APTIC NO. 38590

Suneja, Shan K. and Darsh T. Wasan

DISPERSION OF CHARGED PARTICLES IN A TURBULENT AIR STREAM UNDER TRANSVERSE FLOW CONDITIONS. *Ind. Eng. Chem. Fundamentals, 11(1):57-66, Feb. 1972. 21 refs.*

Equations were developed to predict the diffusion of electrically charged particles in a turbulent air stream within a circular straight porous pipe with uniform transverse flow at the walls. Calculated concentration profiles agreed well with those determined experimentally in the absence of electric charge on the particles. In the experiments, an aerosol of 5-micron particles of potassium chloride was introduced from a point source located at the axis of a fully developed turbulent flow of air in a 6-inch diameter pipe, and time-averaged concentration distributions were measured at four distances downstream. Average velocities covered a range from 9.55-23.0 ft/sec with transverse injection velocities ranging from 0-0.170 ft/sec. The highest injection velocity corresponded to 29.0% of that of the main stream. The plume width of the dispersing aerosol is affected by the transverse flow. The effective dispersion coefficient and the radial mass flux for charged and uncharged particles increase with air injection and decrease with suction through the pipe walls. Also, for increasing values of aspect ratio (length/diameter), they increase with injection and decrease with suction. An understanding of the way gases and particulate matter diffuse from a point source in turbulent streams is important for the aerodynamic design of air pollution control equimpment. (Author abstract modified)

19865 APTIC NO. 38339

Weller, W.

DESIGN AND FUNCTION OF A DUST GENERATION PLANT FOR DUST INHALATION EXPERIMENTS WITH ANIMALS. *(Aufbau und Funktion einer Bestaubungsanlage fuer tierexperimentelle Inhalationsversuche). Text in German. Beitr. Silikose-Forsch. (Pneumokoniose), 23(4):209-223, 1971. 11 refs.*

The entire dust generation plant for dust inhalation experiments with animals comprises two systems: the dust generation system consisting of the dust generator, a preliminary sedimentation chamber and a mixing chamber; and the dust distribution system consisting of a ventilator, an air distribution system, an exposure chamber, an air collection system with waste air ventilator, and dust filter. The dust-laden air produced in the generator is blown out of the unit by means of compressed air. It is passed to the preliminary sedimentation chamber for separation of coarse particles and agglomerations. Next the dust-laden air goes to the mixing chamber where it is mixed with the drawn-on ambient air. By way of the ventilator and the air distribution system, the dust-containing air is blown into the exposure chamber. From there it goes to the air collection system and is either returned to the mixing chamber or it is passed as waste air over dust filters and the ventilator and discharged into the open air outside. With this unit a defined and reproducible dust concentration can be obtained.

EFFECTS-HUMAN HEALTH

19866 APTIC NO. 37795

FLUORIDE INTOXICATION IN HUMANS. *Fluoride Quart. Repts., 4(3):102-108, July 1971. 40 refs.*

Fluoride enters the human system through ingestion with food and water, less through inhalation, and to an even more limited extent through the skin. In a nonfluoridated area, the estimated F(-) intake through food is 0.03-0.5 mg/day. In a fluoridated community, the daily intake by healthly indoor workers is 3/5 mg. Acute poisoning occurs following excessive inhalation of ingestion of F(-) compounds. The acute phase is of significance in evaluating health effects due to air and water pollution, since the acute abdominal pains associated with it are not uncommon during the chronic stage of the disease, probably due to temporary consumption of extraordinarily contaminated food or water. Chronic intoxication can be classified according to its major causes as follows: hydrofluorosis due to drinking water; industrial fluorosis; neighborhood fluorosis, which occurs in populations near F(-)-emitting industries; and alimentary fluorosis due to fluoride-containing food. The clinical picture of F(-) poisoning varies considerably from person to person because of wide differences in F(-) uptake, storage, and excretion. The dental and skeletal changes on which physicans usually depend for the diagnosis of chronic intoxication are not obligatory features of the disease.

19867 APTIC NO. 37942

Ministry of Health and Welfare (Japan), Dept. of Environmental Pollution Control

REPORT ON THE RESULT OF EXAMINATION OF INFLUENCE OF AUTOMOBILE EXHAUST GAS ON HUMAN BODIES. *(Jidosha haiki gasu jintai eikyo chosa kekka hokoku). Text in Japanese. 93p., Feb. 1966.*

The Ohara intersection that has heavy traffic was chosen as a polluted area and the vicinity of National Hygienic Research Institute was chosen as an unpolluted area. An examination of both the environment and the influence on human bodies was made. Carbon monoxide was detected only in the polluted area; the hourly average was 4.1 ppm and the value fluctuated between 0.5 22 ppm, according to the number of automobiles that went by. The momentary value at the center of the intersection averaged 55 ppm and its maximum value reached as high as 110 ppm. Nitrogen dioxide was detected only in the polluted area; the average value was 0.02 ppm and the maximum value was 0.06 ppm. Nitric oxide was detected in both areas; the average in the polluted area was 0.05 ppm, the maximum was 0.074 ppm, the average in the unpolluted area was 0.03 ppm, and the maximum was 0.30 ppm. Floating dust (222 g/cu m) and 4.8 g/cu m of lead were detected in the polluted area, on the hand, the amount of floating dust was 459 g/cu m in the unpolluted area. Sulfur dioxide averaged 0.005 ppm in the polluted area, and the average during the daytime was 0.14 ppm at the center of the intersection. The average of hydrocarbons was 0.66 ppm around the streets, and 0.16 ppm at some distance from the streets in the polluted area; it was 0.05 ppm in the unpolluted area. The subjects of the medical examination were only general inhabitants in the unpolluted area, not only general inhabitants, but also policemen and students were included in the subjects in the polluted area. And as a rule, people who had never smoked were chosen. As a result, during the respiratory function test, no definite trends were observed in either areas. During the blood test, no abnormality was observed in the amount of total hemoglobin in both areas; methemoglobin was not detected. About 4.27% of the carboxyhemoglobin was detected from the inhabitants of polluted area and 2.79% from those of the unpolluted area. The amount of carboxyhemoglobin detected from policemen and students averaged 2.62% before work and 3.75% half a day later. The amount of CO-hemoglobin rose more than 5% when CO concentration rose more than hourly average of 10 ppm. At the interview examination, unpleasant experiences, mental injuries, troubles of digestive organs, and eye irritation were very notable in the polluted area. More detailed data are shown in a separate volume.

19868 APTIC NO. 37948

Kawasaki City Office (Japan), Bureau of Hygiene

PREVALENCE OF RESPIRATORY DISEASES IN DAISHI AND TAJIMA DISTRICTS IN KAWASAKI CITY. *(Kawasaki-shi Daishi, Tajima chiku ni okeru kokyuki shitsujo yushoritsu ni tsuite). Text in Japanese, 36p., Sept. 1969.*

Investigations by interview and pulmonary function tests were carried out for 1479 subjects over 40 yrs old and their families in Daishi and Tajima Districts in Kawasaki at which air pollution was severe. Questionnaires were prepared with reference to those of the British Medical Research Council. About 94.1% of the whole answered. Results of the investigation were compared with the same kind of investigation at Kashima District in Ibaragi Prefecture. A simple test of pulmonary function by vitaler was also carried out. Results of questionnaire were shown in the tables by district, sex, and age. Those with persistent cough were 10.4% in men and 4.9% in women; those with continual sputum were 23.9% in men and 8.1% in women; and acute increase or aggravation of cough or sputum were observed 15.2% of the men and 9.2% of the women, which showed a distinct difference between men and women. Short breathing was higher in women, with 19.6% in men and 25.9% in women. Smokers reached 76% among men, and smokers and non-smokers showed a significant difference in sputum and stridor. As a result, all the symptoms were more prevalently seen in man than in woman, except short breathing. Any difference between districts was not observed. Compared with the investigation at Kashima district, all the data showed higher values. Vital capacity was higher in men than in women, and became lower with the increase of age. Those who showed decreased pulmonary function, 1 sec rate below 60% were 15.0% in men and 8.2% in women, and 13.1% in men and 13.0% in women in Daishi and Tajima districts, respectively; but the way of blowing vitaler was a matter of consideration.

19869 APTIC NO. 38132

Tokyo Metropolitan Government (Japan), Dept. of Hygiene

EFFECTS OF AIR POLLUTION ON INHABITANTS IN 15 SPECIAL WARDS OF TOKYO METROPOLIS. RESULTS OF HEALTH EXAMINATIONS CONCERNING PUBLIC NUISANCE IN THE FISCAL 1969. *(Tokyo-to 15 tokubetsu-ku ni okeru taikiosen no jumin ni oyobosu eikyo. Showa 44 nendo kogai kenshin seiseki). Text in Japanese. 126p., March 1970.*

Health examinations were performed in Tokyo from June to Sept., 1969; 6145 inhabitants were examined, comprising 76.8% of all persons who wanted the examination. Questionnaires, physical examinations, eye, nose, and throat examinations, indirect chest x-ray, simple lung function tests, and urinalysis were performed. Furthermore, close examinations such as direct chest x-ray, sedimentation tests, lung function tests, hematological examinations, and liver and kidney function tests were performed according to the results of the general examinations. The incidence rate of eye diseases was 24.4% in males and 22.7% in females; nose and throat diseases, 34.5% and 32.7%; pulmonary tuberculosis requiring treatment, 0.6% and 0.3%; non-tuberculous lung diseases, 0.4% and 0.3%; renal disorders, 0.5% and 0.6%; liver disorders, 0.4% and 0.4%; and obstructive lung disorders, 3.2% and 2.3%. Incidence rate of lung function disorders, chronic eye diseases, and obstructive lung disorders were higher in residents over 40 years of age.

19870 APTIC NO. 38229

Mie Prefecture (Japan), Yokkaichi Health Center

FOLLOW-UP INVESTIGATION OF THE RECOGNIZED PATIENTS OF DISEASE ASSOCIATED WITH AIR POLLUTION. *(Taikiosen ni kankei no aru ninteikanja no tsuiseki chosa). Text in Japanese. 8p., Feb. 1971.*

The patients associated with environmental hazards were investigated by home visit. During the period of investigation, 19 of the 434 subjects were in hospital, 331 consulted doctors, and 54 had no significant symptoms and had no need of consultation. Favorable results were observed in 197 patients, and a turn for the worse was seen in 49. Favorable results were generally in infants and school children; negative results occurred in the aged. Patients with nasal bleeding increased. Rhinitis, catarrhal nose, and sinus inflammation were complained of by patients. One hundred and twenty-four complained of physical instability from violent fits or offensive odors. Thirty-three complained of constant irritation. The number of recognized patients in different districts, progress in treatment, and data on nasal bleeding were shown in tables.

19871 APTIC NO. 38337

Ministry of Health and Welfare (Japan), Dept. of Environmental Pollution Control

OUTLINE OF SURVEY REPORT CONCERNING EFFECTS OF SOOT AND SMOKE. *(Baien tou eikyo chosa hokoku no gaiyo). Text in Japanese. 140p., 1969.*

Since 1965, medical investigations and environmental surveys have been carried out in order to know the effects of air pollution on the health of schoolchildren. The investigations were performed on fifth and sixth grade children of polluted schools and non-polluted schools for controls in Osaka City, Yokkaichi City, and Ichihara City. The amount of soot and dust fall increased in all districts, and sulfur oxides increased in both Yokkaichi City and Ichihara District. The effects of waste smoke into the home were significant in schools in polluted districts. Children who were easy to catch cold and who had asthmatoid signs were significant in the polluted schools. The rate of complaints of subjective symptoms such as eye ache, sore throat, headache, nausea, cough, and sputum showed a high percentage with significant difference. There were many persons who had a family history of asthma in Yokkaichi and many persons who had history of strophulus in the Ichihara District. Results of the medical investigations showed that the significant difference was not noticed in every district. In Yokkaichi District, the respiratory function test by vitaler and timed vital capacity for the same stature group showed low values with significant difference. The rate of timed vital capacity also showed low values. An index of each district showing respiratory functions was obtained by reducing one standard deviation from the mean value of timed vital capacity of the control district, and polluted schools showed a higher percentage in every place, except for sixth-year children in Osaka District. Boys showed a higher rate than girls in Yokkaichi City and Ichihara District. An investigation of respiratory resistance was carried out by the oscillation method in Osaka District and the resistance of the respiratory tract by plethysmography was measured in Yokkaichi District. Both results showed high values in polluted schools. In the oto-rhinolaryngological investigation in Ichihara District, hypertrophic rhinitis, pharyngitis, and tonsillar hypertrophy were observed in polluted schools.

19872 APTIC NO. 38338

Committee of Mie Prefectural Medical Insurance on Public Nuisance (Japan)

THE 1968 RESEARCH REPORT. STUDIES OF VARIOUS RESPIRATORY DISEASES WHICH ARE SUSPECTED AS BEING INFLUENCED BY AIR POLLUTION AND WERE TREATED BY THE DOCTORS OF YOKKAICHI MEDICAL ASSOCIATION; ADMINISTRATION OF THE PATIENTS RECOGNIZED AS BEING SUFFERED FROM THE DISEASES ADMITTED BY YOKKAICHI CITY AUTHORITIES AS BEING CAUSED BY AIR POLLUTION. *(Showa 43 nendo chosa kenkyu hokokusho. Yokkaichi-ishikaiin no shinryoshita taikiosen no eikyo no aru to omowareru kakushu kokyukishikkan no chosakenkyu. Yokkaichi-shi no ninteisuru taikiosen kankei kanren shikkan ninteikanja no kanri). Text in Japanese. 162p., March 1969.*

A statistical survey by month and by area of various obstructive respiratory diseases is given. In May and August 1968, and January 1969, the patients with bronchial asthma, chronic bronchitis, and pulmonary emphysema who had visited medical institutions were examined as to their address, kind of health insurance they carry, and whether they were in hospital or outpatients. The examination revealed that every disease increased in the Yokkaichi area, and in January the increase was significant. Chronic obstructive lung diseases were studied from the standpoint of pulmonary emphysema. The 284 patients with chronic obstructive lung disease who visited the department of internal medicine of Yokkaichi Hospital were examined about the shifting their chronic obstructive lung disease to pulmonary emphysema. The patients with chronic obstructive lung disease accounted for 3.6% of all the patients receiving internal treatment in Yokkaichi Hospital, and this showed a cumulative increase compared with the previous examination. Further, between people living in the polluted area and those living in non-polluted area, there was no significant difference of the attack rate. Examination with chest x-rays, of pulmonary ventilation, and by electrocardiogram revealed that about 30% of the patients of over 40 years old who suffered from bronchial asthma, asthmatic bronchitis, chronic bronchitis also suffered from functional pulmonary emphysema, and about 20% were moving into pulmonary emphysema state or their merger. Administration of the patients who were recognized by Yokkaichi City authorities as the sufferers from those diseases caused by air pollution is discussed. Methods of the administration of authorized patients by the Yokkaichi Medical Association, trends of authorized patients from 1965 to 1968, and results of examination of the state of authorized patients receiving of medical treatment from October 1968 to March 1969 were reported.

19873 APTIC NO. 38399

International Union Against Cancer, Working Group on Asbestos and Cancer

WORKING GROUP ON ASBESTOS AND CANCER. *Arch. Environ. Health, vol. 11:221-229, Aug. 1965. 8 refs.*

Epidemiological, pathological, physical, and chemical aspects of investigations into the association of exposure to asbestos dust and cancer were investigated by a working group of the International Union Against Cancer. Based on reports and research of the group members, recommendations for further studies are presented. Epidemiological studies of the importance of fiber type, relation to dust dosage, effects of removal from dust exposure, mesotheliomal tumors, and methods and criteria of disease determinations are suggested. Techniques for the pathological diagnosis of asbestosis and mesotheliomal tumors are considered, and the contribution of experimental pathology is reviewed. With respect to physics and chemistry, proposals for establishing reference samples of the types of asbestos and methods of identification of asbestos in tissues are discussed.

19874 APTIC NO. 37820

Alarie, Yves, Charles E. Ulrich, William M. Busey, Alex A. Krumm, and Harold N. MacFarland

LONG-TERM CONTINUOUS EXPOSURE TO SULFUR DIOXIDE IN CYNOMOLGUS MONKEYS. *Arch. Environ. Health, 24(2):115-128, Feb. 1972. 25 refs.*

Cynomolgus monkeys were exposed to sulfur dioxide for 24 hrs a day, seven days a week, for 78 weeks, while a control group was exposed to filtered air. Frequent measurements were made to evaluate mechanical properties of the lung, distribution of pulmonary ventilation, the diffusing capacity of the lung, and the arterial blood oxygen tension. Hematological and clinical biochemical determinations were conducted. A microscopic evaluation of organs and tissues was conducted at termination of the exposure of the animals. No deleterious effect could be attributed to SO2 exposure at concentrations of 0.14-1.28 ppm. Following 30 weeks of exposure to 4.69 ppm, an overexposure occurred in this group. This was followed by deterioration in pulmonary function which persisted during the following 48 weeks of observation, and alterations in pulmonary tissues were observed upon microscopic examination. (Author abstract modified)

19875 *APTIC NO. 38298*

Amdur, Mary O.

THE IMPACT OF AIR POLLUTANTS ON PHYSIOLOGIC RESPONSES OF THE RESPIRATORY TRACT. Proc. Am. Phil. Soc., 114(1):3-8, Feb. 1970. 12 refs.

Some specific aspects of experimental toxicology with respect to the effect of air pollution, specifically sulfur dioxide, on the respiratory tract are reviewed. Experimental toxicology develops information on the mode of action of specific pollutants, the relative potency of pollutants with a similar mode of action, and the effect of one pollutant on the magnitude of response to another. One basic physiological response to inhalation of SO2 and related irritants is bronchoconstriction. Sulfur dioxide gas, however, is readily converted in the atmosphere to sulfuric acid and particulate sulfates, whose irritant potency is much greater than that of SO2 alone. The methodology for a biological assay method to evaluate the response at a level of reversible physiological change is reviewed. Particle size is also a prime factor in the overall biological impact of inhaled particulate matter. Not only is the irritant effect of sulfates greater for smaller particles at a given concentration, but the dose-response curve steepens as the particle size is decreased. The comparative potency of SO2, H2SO4, and zinc ammonium sulfate was computed and compared. The effect of particulate matter of the response to SO2 is also considered.

19876 APTIC NO. 37935

Baker, Frederick and Casimir F. Tumasonis

CARBON MONOXIDE AND AVIAN EMBRYOGENESIS. *Arch. Environ. Health, 24(1):53-61, Jan. 1972. 28 refs (Presented at the American Society for Microbiology, Annual Meeting, 70th, Boston, Mass., April 29, 1970.)*

Embryonated chicken eggs were exposed continuously to various carbon monoxide concentrations during the first 18 incubation days. Hatchability and viability were inversely related to CO concentrations. The 8th to 14th incubation days constituted the critical period, beginning with the 425 ppm level. Macroscopic observations on experimental embryos revealed compensatory hypertrophy of extra-embryonic blood vessels, and amnionic vesiculation. Elevated serum lactic dehydrogenase and increased serum albumin levels occurred in embryos exposed to 425 ppm CO. A quasi-taliped condition appeared in hatched chickens exposed to 650 ppm. Carboxyhemoglobin levels of controls were uniform, averaging 1.50% from the 10th to 16th incubation day; levels of embryos exposed to 425 ppm CO averaged 6.15% from days 10 to 14 with abrupt increase to a mean 14.85% on days 15 to 16. (Author abstract)

19877 APTIC NO. 38616

Barnea, Matei and Pascu Ursu

NOXIOUS EFFECTS OF AIR POLLUTION. *(Efectele Nocive ale impurificarii aerului). Text in Romanian. In: Protectia atmosferei impotriva impurificarii cu pulberi si gaze. Bucharest, Romania, Editura Technica, 1969, Chapt. 7-9, p. 130-183.*

The mechanism of interaction between air pollutants and the respiratory tract is analyzed. Aerosols are categorized into toxic and nontoxic species and the indirect damaging of the latter as carriers for toxic substances is pointed out. The action of lead, fluorine, arsenic, beryllium, Manganese, and carcinogenic compounds is reviewed among the toxic aerosols. Included are discussions on the action of carbon monoxide, sulfur dioxide, nitrogen oxides, chlorine, hydrogen sulfide, and oxidant gases on the animal and plant organism. Reference is made to air pollution dwelling in metropolitan areas such as London, Los Angeles, or New York. Data illustrating morbidity and mortality due to chronic exposure to polluted environments are included. Discussions on economic damage from air pollution due to construction and other material deterioration are presented. The effect of air pollution on meteorology and solar radiation is also discussed.

19878 APTIC NO. 38579

Barry, Patrick Stephen Ian

LEAD IN THE AMBIENT ENVIRONMENT: A REVIEW OF HEALTH EFFECTS. *(Olovo u covjekovoj okolini. Pregled utjecaja na zdravlje). Text in Serbo-Croatian. Nafta (Zagreb), 22(2):97-101, Feb. 1971. 50 refs.*

This is a compilation of information regarding the contribution of automobile exhaust gases to the lead concentration in the ambient air and lead s effects on health. Lead metabolism in man in health and disease, lead in city atmospheres, enzyme inhibition by lead under normal urban conditions, lead in food, plumbism in children and workers, and lead in human bones, blood, and urine are discussed. The adverse effects of lead present in the atmosphere on health claimed by some of the investigators have not been confirmed by any evidence. On the basis of many studies undertaken throughout the world during the past 40 yrs, the daily intake of lead from all sources by the entire population is not higher than it was in the past and lead emitted in automobile exhaust gases has an insignificant effect on man s health.

19879 APTIC NO. 37788

Blokker, P. C.

A LITERATURE SURVEY ON SOME HEALTH ASPECTS OF LEAD EMISSIONS FROM GASOLINE ENGINES. *Atmos. Environ., 6(1):1-18, Jan. 1972. 64 refs.*

Literature on the health aspects of lead emissions from gasoline engines is surveyed. Data on the amount and concentrations of lead in the atmosphere, the influence of atmospheric lead on the lead content of food and drinking water, and the influence of lead alkyls on the hydrocarbon, carbon monoxide, and nitrogen oxide emissions from gasoline engines are reviewed. With regard to health aspects, absorption and excretion of lead, the lead content in the human body in toto, in blood, and in urine, studies on lead burdens in selected population groups, animal studies, and an assessment of general and specific health hazards are examined. Current fields of research in this area are discussed.

19880 APTIC NO. 38430

Blumer, W. and R. Jaumann

MORTALITY AMONG THE RESIDENTS LIVING ALONG A HIGHWAY. *(Mortalitaet bei den Anwohnern einer Autostrasse). Text in German. Z. Praeventivmed,. vol. 16:411-412, 1971. 4 refs.*

The mortality and causes of death of 134 adult residents along a busy highway has been compared with that of 193 residents of an area entirely free of traffic. The group of 40-year olds prevailed among the residents along the highway. Percentagewise, more than twice as many persons residing along the highway died as compared with the second group. In all age groups, the mortality was higher among the first group. The most frequent cause of death among this group were malignant tumors, which were twelve times more frequent among the traffic-exposed group than the non-exposed group. However, no causal connection with air pollution caused by motor cars can be derived. Further studies are required.

19881 APTIC NO. 38694

Bryks, Samuel and Felix D. Bertalanffy

CYTODYNAMIC REACTIVITY OF THE MESOTHELIUM. *Arch. Environ. Health, 23(6):469-472, Dec. 1971. 11 refs.*

The cytodynamic reactivity of rat pleural mesothelium to intratracheally administered dust suspensions of synthetic or natural chrysotile asbestos in saline was examined using the tritiated thymidine technique. Natural chrysotile increased the labeling index of the visceral pleural mesothelium as early as 5 and 7 days after the treatment. The loss of label from this group, after the administration of tritiated thymidine at the time of treatment, occurred more rapidly than is control saline-treated animals. A similar, but lesser, decline in the labeling index was determined in the rats treated with synthetic chrysotile. (Author abstract modified) 00

19882 APTIC NO. 38255

Cohen, Charles A., Arnold R. Hudson, Jack L. Clausen, and John H. Knelson

RESPIRATORY SYMPTOMS, SPIROMETRY, AND OXIDANT AIR POLLUTION IN NONSMOKING ADULTS. *Am. Rev. Respirat. Disease, 105(2):251-260, Feb. 1972. 34 refs.*

A comparison of respiratory symptoms and pulmonary function tests in two similar groups of nonsmoking adults who were chronically exposed to essentially the same mean value but different peak values of oxidant air pollution did not show a difference in the prevalence of symptoms suggestive of pulmonary disease. The study populations were 244 subjects from San Diego, where the maximum hourly oxidant average exceeded 0.15 ppm for only 6.1% of the days in 1963-1967, and 197 subjects from the San Gabriel Valley, where the maximum hourly oxidant average exceeded 0.15 ppm for 45.7% (Azusa) or 43.8% (Pasadena) of the days. Analysis of different ventilatory parameters measured by spirometry and maximal expiratory flow volume curves also did not indicate significant differences between the groups. The study, therefore, did not support the hypothesis that chronic exposure of nonsmokers to two-fold differences in peak values of oxidant air pollution results in either increased incidence of symptoms of chronic lung disease or in impairment of lung function as reflected by spirometry or flow-volume loops. (Author abstract modified)

19883 APTIC NO. 38187

Corn, Morton, Nancy Kotsko, Dolores Stanton, William Bell, and Armand P. Thomas

RESPONSE OF CATS TO INHALED MIXTURES OF SO2 AND SO2-NACL AEROSOL IN AIR. *Arch. Environ. Health, 24(4):248-256, April 1972. 23 refs. (Presented at the American Medical Association, Air Pollution Medical Research Conf., New Orleans, La., Oct. 5, 1970.)*

Twenty healthy, adult male cats were lightly anesthetized with pentobarbital (Nembutal) sodium and tracheotomized; respiration was maintained by pump. Medical-grade breathing air, with or without sulfur dioxide alone or in combination with sodium chloride aerosol was delivered in predetermined exposure sequences. Pulmonary flow resistance and lung compliance were evaluated. Pollutants were delivered also delivered via endotracheal catheter or face mask, or both. Approximately 20 ppm of SO2 in air was required to evoke a significant change in pulmonary flow resistance in reactors. The majority of animals showed no response to this concentration of SO2 either alone or with the NaCl aerosol (10 mg/ cu m). An increased frequency of significant changes in pulmonary flow resistance was suggested when pollutants were delivered via endotracheal catheter or face mask. All alterations in parameters or response were reversible shortly after exposure ceased. (Author abstract)

19884 APTIC NO. 38706

Evans, Michael J., Robert J. Stephens, Linda J. Cabral, and Gustave Freeman

CELL RENEWAL IN THE LUNGS OF RATS EXPOSED TO LOW LEVELS OF NO2. *Arch. Environ. Health, vol. 24:180-188, March 1972. 20 refs.*

The effects of continuous exposure to low concentrations of nitrogen dioxide on cell proliferation in bronchiolar and alveolar tissues were studied in rats. The dividing cells were labeled with tritiated thymidine. Labeling index in terminal bronchioles and alveoli of animals exposed to 17 ppm NO2 increased after 2-3 days of exposure, but returned to control levels by 5 days. Similar results with a smaller increase were determined for animals exposed to 2 ppm NO2. Within three days of continuous exposure, epithelial hyperplasia of terminal bronchioles and increased cellularity of alveoli associated with the distal ends of the terminal bronchioles were established; in peripheral alveoli, turnover rate of type 2 alveolar cells increased. (Author abstract modified)

19885 APTIC NO. 37779

Feldman, Yu. G.

THE PROBLEM OF BIOLOGICAL ACTION OF CERTAIN PRODUCTS FROM ATMOSPHERIC PHOTOCHEMICAL REACTIONS. *(K voprosu o deystvii nekotorykh atmospfernykh fotokhimicheskikh reaktsiy). Text in Russian. Gigiena i Sanit., 37(1):6-9, 1972. 15 refs.*

Problems and experiments regarding the determination of a threshold concentration for mixtures of ozone, nitrogen dioxide, and formaldehyde are described. The respective odor thresholds applied were 0.015 mg/cu m, 0.23 mg/cu m, and 0.073 mg/cu m. Odor threshold experiments with three different mixtures of the above substances showed a simple summation of the effects. In another experiment, the effect of such mixtures on the electric activity of the human brain was investigated. The threshold concentrations applied for ozone and NO2 were 0.01 mg/cu m and 00.06 mg/cu m, respectively. Formaldehyde admixed in a concentration of 0.04 mg/cu m showed no effect on the biopotentials. The threshold here was also formed by a simple summation of the effects. Long-term experiments were carried out on rats with two different summary concentrations of 0.85 and 8.5. Considerable changes were found in the motoric chronaxia in the latter case, while the blood cholinesterase activity showed slight variations only. Thus, the below-threshold concentration, inefficient for man in short-term exposure proved to be also indifferent for animals in the long-term experiment.

19886 APTIC NO. 38602

Fujii, Toru

PRESENT STATE OF PHOTOCHEMICAL SMOG IN OSAKA PREFECTURE. *(Osaka fuka ni okeru kokagaku sumoggu no genkyo ni tsuite). Text in Japanese. Kogai Taisaku to Gyosei (Environ. Pollut. Countermeasure Adm.), 3(12):63-77, Dec. 1971.*

The photochemical smog conditions of Osaka Prefecture are discussed with emphasis on the incident of August 27, 1971 in the areas south of the Yamato River. At present, oxidant concentration is continuously measured at 11 locations in the prefecture by a colorimetric quantitative method using a neutral buffer of 10% potassium iodide solution as absorbent. When the concentration reaches 0.10 ppm, a pre-warning is issued; when it reaches 0.15 ppm, a warning is issued; and when it reaches 0.30 ppm, an alarm is issued. Various steps are to be taken by residents, children, school children, factory workers, and community administrative bodies after each warning. The maximum oxidant concentration detected in various parts of Osaka Prefecture on August 27 was 18 ppm. The ozone concentration measured by the ethylene method rose from 0.15 ppm to 0.24 ppm between noon and 2:30, averaging at 0.22 ppm. A total of 249 persons complained about pains in the throat, eye, head, coughing, breathing difficulty, eye irritation, bloodshot eyes, and numbness in the limbs. Ten persons were hospitalized on that day. Since then, the highest concentration of 24 ppm was reached on September 14 in ten cities in Osaka Prefecture for several hours, and a total of 339 persons complained of similar symptoms as those mentioned above and nausea. The warnings were issued most frequently in September, and then in July and August, in that order. However, the number of days with more than 0.15 ppm concentration of oxidant was highest in July. The measurements of hydrocarbons, nitrogen oxides, sulfur dioxide, aldehydes, and sulfuric acid mist are presented by tables. Various clinical symptoms of hospitalized persons are also presented by tables.

19887 APTIC NO. 37889

Fujino, Toshiyuki, Hideo Oshima, Masayuki Imai, and Fukiko Kawagishi

EPIDEMIOLOGICAL STUDY OF EFFECT OF AIR POLLUTION AGAINST HUMAN BODY. *(Taiki osen no jintai ni oyobosu eikyo ni kansuru ekigaku teki kenkyu). Text in Japanese. In: A Study of the Administration Method of Medical Care for Sufferers from Public Nuisance in Yokkaichi City. Mie Prefectural Health and Medical Study Council (Japan), p. 1-25, March 1971.*

At Yokkaichi city, a survey on the incidence rate and death rate, a medical examination of the inhabitants, and a survey on the situation of patients who were recognized as victims of environmental pollution were carried out. The results of the surveys conducted during 1969 and those conducted from 1961 to 1968 are compared and discussed. The incidence rate was given according to the number of receipts of national health insurance. Sore throat, influenza with bronchitis, bronchial asthma, and anterior eye impairment had a higher rate in Shiohama, a polluted area, than in Mie and Hobo, control areas. In the polluted area, bronchial asthma suddenly increased from the middle of 1961. In control areas, too, this began to increase each year since about 1968. This is an effect of the widening of the polluted area due to tall stacks. The death rate for damage in the blood vessels of the central nervous system, heart diseases, tubercular diseases, and pneumonia is higher in the control area; in the polluted area, it is high in malignant neoplasms, diseases of the respiratory apparatus, and lung cancer. There was a significant difference in obstructive respiratory diseases at a 5% danger ratio between the polluted area and the control area. Symptoms of chronic bronchitis were seen more in men and increased with the advancement of age. The effect of smoking was also noticed. The situation of patients who were recognized as victims of environmental pollution (especially patients in the Isozu area) was studied. By diffusion with tall stacks, the pollution of this area was rather highly improved. Thus, the increasing rate of number of patients lessened. Peaks of outbreaks of new patients were in 1962 with bronchial asthma; in chronic bronchitis and asthmatic bronchitis, the peak was in 1965; since then, the number has gradually become smaller. As of the end of June 1971, there were 101 recognized patients; since this is 3.7% of the whole population, the figure is very high. More men are patients; young and older people are affected the most.

19888 APTIC NO. 37895

Fujiwara, Masakazu, Yoichi Nakamura, Kenzo Sudo, Hideyo Tsukamoto, Etsuo Kuroda, Etsuro Koyanagi, Junichi Masumura, and Kenkichi Itami

FOLLOW-UP STUDIES ON THE SUBJECTS HAVING HEALTHY APPEARANCE IN AIR POLLUTED ENVIRONMENT. *(Taiki osen kankyo ka ni okeru gaikenjo kenkosha no seimitsu kenshin ni yoru keinenteki chosa). Text in Japanese. In: A Study of the Administration Method of Medical Care for Sufferers from Public Nuisance in Yokkaichi City. Mie Prefectural Public Nuisance Health and Medical Study Council (Japan), p. 113-130, March 1971.*

Medical examinations including a pulmonary function test, direct chest X-ray, electrocardiogram, liver function test, allergen test, measurement of blood pressure, and general urinalysis were performed during the period of Sept. to Dec. in 1970 on 188 women who were living in the air polluted area. Ten of 188 subjects had under 85% vital capacity. According to the data by the age group 20-50, the pulmonary functions were within the normal range, but it seemed that the pulmonary functions gradually decreased with the increase of age. The air flow resistance was slightly higher than the average seen in the women in the Tomita area, considered to be a non-polluted area by the examination during Dec. 1968 to Jan. 1970. On chest X-ray, 64 subjects had findings which were inflammatory changes, but no progress of pulmonary emphysema and pulmonary fibrosis was seen. Only one subject with slight restrictive impairment showed abnormal findings in the liver function test, urinalysis, and electrocardiogram.

19889 APTIC NO. 37955

Funabashi, Shigeru, Tatsuya Hayashi, Toshiyuki Nishimuta, Nobukiyo Sakurai, Masaru Mizoguchi, Keiji Kishimoto, Toru Takayama, Yoshiko Muramatsu, Ryotaro Tochigi, Yoshio Takayama, Katsumi Yamada, Akira Sato, Sekka Ryu, Shu Terashima, Junichi Ito, Misako Murata, Tsuyoshi Toba, Suzuko Uehara, Seiji Kubo, Masao Matsumura, Kozo Ito, Motoaki Adachi, Ken Motomiya, and Ryo Yoshida

AIR POLLUTION AND INFANTILE BRONCHIAL ASTHMA - 2ND REPORT. CLINICAL SPECIFICITY OF SCHOOL CHILDREN WITH ASTHMA IN A POLLUTED AREA. *(Taikiosen to shonikikanshizensoku. Sono2: osenchiku zensokuji no rinshoteki tokuisei). Text in Japanese. Shonika Shinryo (J. Pediat. Pract.), 35(3):288-295, March 1972. 61 refs.*

Clinical findings in 163 school children certified by examination to have asthma, conducted from Oct. 1968 through May 1970 in Fuji city are reported. Fuji city was divided into three districts according to the degree of sulfur dioxide concentrations. Main substances polluting Fuji city are sulfur dioxide, sodium sulfate dust, and mercaptans. The investigation was made by direct interviews with school children with asthma and their parents using questionnaires for allergic diseases of the respiratory organ. Eosinocyte count in blood and in sputum and hypersensitivity tests were made. The ratio of males to females with asthma was 1.59 2.1 in three districts; there was not any difference among these districts. Those who developed asthma until 5 years old were 74.4% in the more-polluted district and 64% in both the moderately and the less-polluted area; this was not statistically significant. The rate of school children who had attacks regardless of the season was higher in the more-polluted district (33%) and it decreased according to the degree of pollution. Incidence of asthma in the more-polluted district was high in winter. Eosinophilia was seen in peripheral blood, secretions from the nose, and sputum. Allergic history of the individuals and their family was equally high in any of the districts. Bronchial hypersensitivity was generally recognized, but the incidence of positive reaction in intracutaneous antigen reaction was low. According to these clinical findings, the asthma in the districts was almost in the same category as ordinary asthma based upon allergic factors. However, age of onset, seasonal variation, and sputum findings of asthma in the more-polluted area were thought to have some specificities.

19890 APTIC NO. 38021

Gartmann, J.

AIR POLLUTION AND CHRONIC BRONCHITIS. *(Luftverschmutzung und chronische Bronchitis). Text in German. Schweiz. Med. Wocherschr. (Basel), 102(4):109-114, 1972. 20 refs.*

Present statistical methods for determining the correlation between air pollution and chronic bronchitis take into consideration mainly short-term variations in clinical symptoms and lung function tests. A day-to-day study of these values may give satisfactory results if pollutant concentrations are high. For low concentrations the method is less useful because low concentrations and intermittent exposure will be followed by a relatively long latent period. A delayed diminution of alveolar phagocytosis was found in several experimental animals exposed to low concentrations of sulfur dioxide and nitrogen dioxide. The problem of chronic toxicity requires further investigation.

19891 APTIC NO. 38076

Ghezzi, I., P. Maranzana, and D. Zannini

CONSIDERATIONS ON ASBESTOSIS IN PIEDMONT, LIGURIA AND LOMBARDY. *(Considerazioni sull asbestosi in Piedmonte, Liguria e Lombardia). Text in Italian. Med. Lavoro (Milan), 62(2/3):111-119, Feb./March 1971. 1 ref.*

Since the initiation of compulsory insurance against asbestosis in Italy in 1943, 1530 workers in Piedmont and in the provinces of Milan, Bergamo, and Genoa have been compensated for asbestosis pneumoconiosis. Of this number, 1205 were still living on March 31, 1970. Thirty-two percent of the cases represented moderate or advanced asbestoses; however, the percentage was higher than 50 when only textile and dockyard workers were considered. Pleural changes, calcific and non calcific, were radiologically demonstrated in 52% of asbestotic subjects who had worked in textile mills but only in 14% of the subjects who were chrysotile miners. Of the 325 dead workers, 165 (57%) died of causes directly related to asbestosis (cardio-respiratory insufficiency, tuberculosis, and pleural and lung tumors). Pleural and lung tumors were found in 34 subjects, i.e., 10.5% of the dead workers. The incidence of such tumors was maximal (19.5%) among former insulation workers and minimal (2.6%) among ex-miners exposed only to chrysotile; in the last group no pleural mesothelioma was found. The results are also reported of 466 dust measurements carried out in as many work places. In 36.3% of the counts, the asbestos concentration was higher than 12 fibers/ml. The maximum asbestos concentration was recorded in the atmosphere of a textile workshop (carding).

19892 APTIC NO. 38086

Goldstein, Bernard D., Maura R. Levine, Richard Cuzzi-Spada, Ramon Cardenas, Ramon D. Buckley, and Oscar J. Balchum Environ. Health, 24(4):243-247, April 1972. 30 refs.

The ability of p-aminobenzoic acid to protect against ozone toxicity was demonstrated in two experimental systems. acid and anthranilic acid, inhibited the ozone-induced loss of activity of the enzyme acetylcholinesterase in human erthrocytes exposed in vitro to 40 ppm of ozone. Protection in vivo was demonstrated in a study in which 15 rats injected intraperitoneally with 2 ml of 20 mM PABA prior to ozone exposure died in a mean of 426 min as compared to a mean of 261 min for 15 control animals similarly exposed to 15 ppm of ozone. These findings provide additional presumptive evidence of the importance of free radicals in the mechanism of ozone toxicity. They further suggest that PABA and related compounds warrant exploration as possible protective agents in susceptible populations exposed to significant photochemical air pollution. (Author abstract modified)

19893 APTIC NO. 37783

Gomelauri, L. Z. and V. I. Bakhutashvili

TISSUE CULTURE AS A MODEL FOR STUDYING THE TOXIC ACTION OF MOTOR TRAFFIC EXHAUST GASES. *(Kultura kletok kak model izucheniya toksicheskogo deystviya vykhlopnykh gazov avtotransporta). Text in Russian. Gigiena i Sanit., no 12:61-63, March 1972. 2 refs.*

The effects of exhaust gases, and the combined effects of exhaust gases and virus were modeled on transplanted and primary human and animal cell cultures. The cultures treated with blood serum, penicillin, and streptomycin were exposed to exhaust gases for 15 min. Microscopic examinations of the cell cultures 24 hrs after the above exposure revealed a sharp drop in the cell count. Fibroblastoma-like deformations were found in epithelium cells. Cytopathic effects, minimum mitosis, degeneration, and necrosis were revealed in primary cultures (lung tissue and embryo). Transplanted and primary cultures as well as human and animal tissues alike were affected by exhaust gases, while the control cultures showed no lesions. In another experiment the combined effect of exhaust gas and influenza virus on cell cultures was studied. With a viral dose of 0.1 ID50, irreversible alterations characteristic of the respective effects of exhaust gas and virus were observed; mitosis was nonexistent. The experiments confirmed the applicability of tissue cultures as models for studying toxic effects of exhaust gases.

19894 APTIC NO. 38710

Greenburg, Leonard

THE CLASSIFICATION OF DUSTS WHICH CAUSE PULMONARY DISABILITY. *J. Occup. Med., 14(2):146-149, Feb. 1972. 17 refs. (Presented at the International Conference of Experts on Pneumoconiosis, Sydney, Australia, Feb.-March 1950.)*

Health hazards due to dusts as diagnosed by x-rays and analyses of occupational history are reviewed. In the production of pneumoconiosis, the critical factors of dust exposure are the concentration of dust in the atmosphere, duration of the exposure, size of the dust particles, and the nature or composition of the dust. Dusts associated with pulmonary disability include organic dusts (cotton and bagasse) and inorganic dusts, i.e., metallic (beryllium) and non-metallic dusts, subdivided into non-siliceous and siliceous combined (talc) and free silica (sand and diatomaceous earth) categories. The respiratory diseases associated with occupational exposure to the various dusts include byssinosis, acute bronchiolitis, acute bronchitis, chronic granulomatosis, emphysema, and silicosis.

19895 APTIC NO. 37964

Haas, Th., A. G. Wieck, K. H. Schaller, K. Mache, and H. Valentin

THE USUAL LEAD LOAD IN NEW-BORN INFANTS AND THEIR MOTHERS. *(Die usuelle Bleibelastung bei Neugeborenen und ihren Muettern). Text in German. Zentralbl. Bakteriol., Parasitenk. Infektionskr. Hyg.: Abt. 1: Orig., Reihe B, 155(4):341-349, 1972. 30 refs.*

The primary source of lead in the atmosphere is automobile exhaust. The lead compounds in the exhaust gases not only contribute to pollution but also pollute vegetation; humans, therefore, both inhale and ingest lead. Lead intake by humans starts in prenatal life. The blood lead level and the excretion of delta-aminovulinic acid in the urine were determined in 294 new-born infants and their mothers. In all cases, lead was found in the blood of the infants, with the average level at 14.98 + or 7.89 micrograms %. This was significantly below the average level determined in the blood of the mothers (16.89 + or 8.57 micrograms %). Statistically, the lead concentration in the infants depended on the lead level in the blood of the mothers. The average delta-aminolevulinic acid excretion of infants was 1.9 + or 1.4 mg/l or 4.6 + or - 4.9 mg/g creatinine. A dependence of the acid excretion on the blood lead level of infants could be proved statistically. The average delta-aminolevulinic acid excretion of the women under examination was 5.1 + or 3.1 mg/l (4.3 + or - mg/g creatinine), or about double the amount excreted by adults of both sexes who are not occupationally exposed to lead. The most likely reason for this was an iron deficiency at the end of pregnancy.

19896 APTIC NO. 38292

Handa, Kazuko

HEALTH MANAGEMENT FOR SCHOOL CHILDREN LIVING IN AIR POLLUTED AREA. (NO. 1 SITUATION OF ABSENTEES). *(Taiki osen chiiki ni kyoju suru gakudo no kenko kanri ni tsuite. (daiippo) kesseki jokyo). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan J. Public Health), 18(10):422, 1971.*

Surveys on absenteeism, health situation, medical examination of nose and throat, respiratory function tests, reaction tests for allergy, snivel examination, and X-ray examination were carried out in 1969 for school children in the 2nd, 4th, and 6th grades of seven schools (the enrollment was 2750 in April 1969; by March 1970, it was 2566 due to population fluctuation). Among the seven schools, approximately six were in polluted areas and one was a control school. According to monthly observations of absentee ratio, from spring to summer there was no marked difference among the schools except for one. In winter, three contaminated schools showed district differences from other schools. In contaminated schools, more than one half of the absentees due to illness resulted from respiratory diseases. Oral examination showed many complaints of easy to catch colds.

19897 APTIC NO. 38667

Hueper, W. C.

ENVIRONMENTAL CANCER HAZARDS. *J. Occupational Med., 14(2):149-153, Feb. 1972.*

If cancer as a cause of death has taken during recent decades the place formerly occupied by chronic infectious diseases, this remarkable shift is doubtlessly attributable to a greatly improved control of infectious diseases by therapeutic and sanitary measures, on the one hand, and to a growing recent contamination of the human environment with man-made carcinogens, on the other hand. The seriousness of contacts with certain compounds on human health are evident from experiences derived from industrial carcinogenesis, such as aromatic amino cancers of the bladder in dye and rubber workers and chromate cancers of the lung. Protective factors and the pathogenic action of various agents are mentioned. Among the various similarities which exist in the reaction pattern of the host organism to carcinogens and to other pathogens, the well established species specificity and organ and tissue specificity of carcinogens are discussed. Identification of the etiology in several cases is considered, and some considerations which should govern our attitude toward environmental cancer hazards are listed.

19898 APTIC NO. 38346

Ichinosawa, Akio, Shin ya Inai, Miyoko Ueda, Takashi Komatsu, Shoji Hattori, Hisao Takahashi, Ryuhei Takeishi, Yoshizo Tsunetoshi, Tadahiko Shimizu, and Sei-ichi Hiramatsu

SPUTUM INVESTIGATION. *(Kattan chosa). Text in Japanese. In: Report on the effect of soot and dust in Osaka Prefecture. Liaison Committee of Air Pollution in Kinki District (Japan), p. 39-67, 1969 (?). 11 refs.*

Sputum, viscosity, and bacteria were measured, and hematological and cytological investigations were made on patients in Osaka. The viscosimeter was examined to determine whether measurements could be made easily without destroying gel structure in a short time. Staphylococcus albus, beta-hemolytic streptococci, and nonhemolytic streptococci were found in the sputum of bronchitis patients in polluted areas. Though much Pseudomonas aeruginosa and Escherichia coli were observed, a definite conclusion was not obtained because of the time lag of the data for a comparison in nonpolluted areas. A hematological examination was made using the sputum of chronic bronchitis patients by immuno-electrophoresis, and as a result, albumin, IgA, alpha-trypsin, haptoglobin, transferrin, IgM, and IgG were detected. Further studies are required to confirm the relationship between these protein components and bronchus alterations. Differences in cytological findings of the sputum between comparatively healthy and chronic bronchitis patients was that hystrocytes in the sputum of the latter contained more phagocytized dust than the former. In addition, the frequency of metaplastic cells was higher in the latter. However, the frequency of ccp cell or Curschman s spirals could be determined in so few cases that differences from control groups could not be clearly distinguished.

19899 APTIC NO. 37956

Ishibashi, Osamu

EXPERIMENTAL STUDIES ON THE EFFECTS OF DUSTS AND GASES TO THE LIVING TISSUES – ESPECIALLY ON THE EFFECTS OF THE IRON POWDER AND THE PARABENZOQUINONE TO THE RESPIRATORY ORGANS OF GUINEA PIGS. *(Funjin oyobi shigekisei gasu ni yoru seitai hanno ni kansuru jikkenteki kenkyu. Morumotto ni okeru teppun no p-kinon no kidokei ni oyobosu eikyo ni tsuite). Text in Japanese. Chiba Igakkai Zasshi (J. Chiba Med. Soc.), 47(5):391-399, Jan. 1972. 16 refs.*

Guinea pigs were exposed to iron dust or parabenzoquinone gas; changes of the lung and the bronchi, especially the bronchial wall were examined histopathologically by a light microscope. Experimental animals were divided into six groups. Group A was given iron dust, and Group B was given parabenzoquinone. Group C was given parabenzoquinone immediately after iron dust exposure. Group E received parabenzoquinone after an 8-week interval following iron exposure. Group F was a control. Guinea pigs of every group were killed immediately after the exposure; 2 weeks; and 4 weeks after the exposure. In Group A, disorders of cells, infiltration of cells, widening of the capillary, and inflammatory edema in larrina propria were seen immediately after exposure; these findings almost disappeared 4 weeks later. In Group B, changes in the bronchial wall were less than that of Group A, but infiltration of cells and inflammatory edema still remained for 4 weeks. In Group C, disorders of epithelial cells of the bronchi were extensive, and infiltration of cells, widening of the capillary, and inflammatory edema were severe; they did not recover after 4 weeks. In Group D, the above-mentioned findings were in evidence immediately after the exposure, but they disappeared after 4 weeks. In Group E, the changes were slight, but they remained to some degree after 4 weeks. The effects on the tracheal basement membrane were slight in administration of iron aerosol alone, while the striking widening and disconnection of this membrane were extensive with parabenzoquinone.

19900 APTIC NO. 38428

Jones, Ronald H., Robert L. Williams, and Alice M. Jones

EFFECTS OF HEAVY METAL ON THE IMMUNE RESPONSE. PRELIMINARY FINDINGS FOR CADMIUM IN RATS. *Proc. Soc. Exp. Biol. Med., 137(4):1231-1236, Sept. 1971. 43 refs.*

The effect of heavy metals on the immune response in humans was investigated with emphasis on the effects of cadmium on the synthesis of specific antibodies in rats and cadmium involvement mechanisms. Cadmium injected at various time intervals in relation to antigen administration affected the immune response diversely but significantly as measured by the passive hemagglutination test. Cadmium doses (0.6 mg/kg) initiated 14 and 7 days prior to antigen injection respectively enhanced and suppressed antibody synthesis. Test procedures and results are discussed. (Author summary modified)

19901 APTIC NO. 37898

Kiyoji, Hayashi, Hiroshi Shinagawa, and Yoshimichi Okamoto

FLUCTUATION OF NUMBER OF THE DEATH BY LUNG CANCER IN YOKKAICHI. *(Yokkaichi-chiku ni okeru haigan shibosha no doko). Text in Japanese. In: A Study of the Administration Method of Medical Care for Sufferers from Public Nuisance in Yokkaichi City. Mie Prefectural Public Nuisance Health and Medical Study Council (Japan), p. 165-169, March 1971.*

One hundred and forty eight males and 45 females, a total of 193 people, died of lung cancer between 1957 and 1969 in Yokkaichi City and Mie-gun of Mie Prefecture. The peak of the death was in 60-75 yr olds. The proportion of the death by lung cancer to the whole death rate was 0.22% in 1957 and

1.16% in 1969; it increased five-fold in 13 yrs. The number of the deaths from lung cancer in Yokkaichi had been increasing almost equally without any marked increase or decrease, compared with that in Mie Prefecture and other prefectures. The mortality from lung cancer in a polluted district was increasing compared with that in a non-polluted district since 1967.

19902 APTIC NO. 37892

Kodama, Taichi, Takezo Hattori, Ryo Uejima, and Kouichiro Kobasegawa

CLINICAL STUDY OF RESPIRATORY APPARATUS PATIENTS CAUSED BY AIR POLLUTION IN THE FIELD OF PEDIATRICS. (SURVEY AND OBSERVATION OF CHILDREN S BRONCHIAL ASTHMA IN YOKKAICHI CITY). *(Shonika bunya ni okeru taikiosen ni yoru kokyuki kei kanja no rinsho teki kenkyu. (Yokkaichi-shi ni okeru shoni kikanshi zensoku no chosa oyobi kansatsu)). Text in Japanese. In: A Study of the Administration Method of Medical Care for Sufferers from Public Nuisance in Yokkaichi City. Mie Prefectural Public Nuisance Health and Medical Study Center (Japan), p. 53-74, March 1971.*

After conducting a preliminary survey of schoolchildren with bronchial asthma for all elementary and junior high schools in Yokkaichi City and carrying out a survey by questionnaire, case observations were made. The morbidity was, for elementary schoolchildren, 0.69% in a non-contaminated area and 1.33% in a contaminated area; for junior high school pupils, it was 0.64% and 0.69%, respectively, showing significant difference from elementary schoolchildren. Since the rate was low in the non-contaminated area, it also became evident that air pollution may be a causal factor in children s bronchial asthma. In an examination of the relationship between sulfur dioxide concentration and spasms, a clear relationship was not recognized, but it was evident that the number of spasms tended to be more in the contaminated area.

19903 APTIC NO. 38019

Kosmider, Stanislaw, Marian Drozdz, Mieczyslaw Luciak, Kornel Ludyga, Adam Misiewicz, Jan Szygula, and Kazimierz Zajusz

THE MECHANISMS OF THE TOXIC EFFECT OF COMBUSTION EXHAUST GASES. *Int. Arch. Arbeitsmed., 29(1):28-46, 1971. 30 refs.*

The combined effect of all components of combustion gases was studied by exposing guinea pigs for 116 days to combustion gases introduced to an inhalation chamber from the chimney of a power station. The exhaust was diluted with atmospheric air to attain a sulfur dioxide concentration of about 1 mg/cu nm. The following determinations were made: body weight, blood morphology, acid-base balance, electrolytes, proteins, lipids, and carbohydrates. Both macroscopic and microscopic postmortem examinations were performed. The combustion gases caused a reduction of lung ventilation and consequently respiratory acidosis. Metabolic disturbances, based on changes in proteins (mainly enzymes), were reflected in growth inhibition, reduced resistance, and increased frequency of bacterial infections. The exposed animals displayed disturbances in lipid metabolism, probably as a result of oxidation. A reduction in blood and tissue lipid content after exposure was noticed. Changes in carbohydrate metabolism caused a reduction in liver glycogen content and accumulation of mucopolysaccharides on blood-vessel walls. Observed disturbances in mineral metabolism may have been the result of changes in the activity of enzymes taking part in active transport. Biochemical tests pointed to an intensification of the catabolic processes as well as a decrease in tissue oxidation. The results demonstrate that combustion gases have a multidirectional toxic effect resulting in the impairment of many organs.

19904 APTIC NO. 38108

Kubo, Seiji

HISTOPATHOLOGICAL OBSERVATIONS ON THE TRACHEA OF GERM FREE, CONVENTIONAL, AND SULFUR DIOXIDE EXPOSED RATS. *(Mukin shizen shiiku ratto narabini aryusan gasu bakuro rattokikan no byori soshikigaku teki kenkyu). Text in Japanese. Nihon Jibi Inkoka Gakkai Kaiho (Jap. J. Nephrol.), 74(10):1455-1476, 1971. 68 refs.*

Fischer sterile rats (34) and natural breeding rats (26) were compared concerning the mucous epithelium, submucosa, and tissues of cartilage in the trachea. Wister strain natural breeding adult rats (18) were exposed to sulfur dioxide. They were macroscopically observed for changes in the trachea and the lung. The changes of the mucous epithelium and submucosa in the trachea were histologically examined. A comparison of the three groups of experimental animals were performed regarding histopathological changes of the tracheal mucous epithelium, basement membrane, elastic fiber, and tracheal glands. Every tissue in the trachea was comparatively observed by microscopic measurement. The exposure to SO2 was carried out in a concentration of 10 ppm for 8 hrs a day for 1-51 days. The tracheas showed flare, hyperemia, and hemorrhage on the tunica mucosa. Congestion and hemorrhagic changes mainly occurred in the lung. Histological findings in the trachea showed the lack of mucous epithelium, exfoliation, erosion, and hemorrhagic changes on the mucous epithelium. The acceleration of mucous production in the tracheal mucous epithelium was obvious in the group exposed to SO2 and the natural breeding group, but was not found in the sterile group. The natural breeding group and the group exposed to SO2 had higher values than the sterile group in the measurement of the thickness of the tracheal glands and the ratio of the tracheal glands/tracheal wall. The group exposed to SO2 generally showed a decrease in the number of elastic fibers. In comparison of the cartilage of the sterile and natural breeding animals, mature animals with a large breadth of the cartilage showed strong calcification and asbestos transformation. Young and sterile rats showed metachromasia.

19905 APTIC NO. 38606

Lawther, P. J.

AIR POLLUTION AND ITS EFFECTS ON MAN. *Community Health, 3(3):119-122, Nov./Dec. 1971. (Presented at the Royal Institute of Public Health and Hygiene, London, England, Dec. 1970.)*

Most pollutants in town air arise from the combustion of fuel and the impurities therein. Pollution is usually expressed in terms of smoke and sulfur dioxide; these are convenient and useful indexes, but it must not be assumed that observed effects of pollution on man are due merely to total suspended particulate matter or to sulfur dioxide. Size is important when considering the effect of particulate pollution on man; in order to reach the alveoli, particles must be less than 7 micron in diameter. A feature of particulate pollution which may be of special importance in relation to its effects on health is its vast surface to mass ratio. Gaseous pollutants may be adsorbed on the surface of these tiny particles and may thus penetrate to the alveoli. The effects of air pollution on man are dramatically manifest in the increase in mortality and morbidity seen to be associated with the fumigations commonly called smogs. The more disabled the patient, the more sensitive he is to adverse changes in the environment. There is no doubt that chronic bronchitis is more common in towns than in the less polluted rural areas. As a bonus to the Clean Air Act, a significant reduction in the frequency of days in which concentrations of sulfur dioxide have exceeded 500 micrograms/cu mm has followed the removal of the pall of smoke over the cities.

19906 APTIC NO. 37933

Lehnert, G.

LEAD CONTAMINATION BY AUTOMOBILE EXHAUSTS? (Bleivergiftung durch Autoabgase). Text in German. Deut. Med. Wochschr., 97(11):439- 440, March, 1972.

Are lead additives to the fuel of automobiles dangerous to health at the present traffic density? According to a series of studies in Europe and the U. S., it must be assumed that at least during longer exposure at traffic intersections the intermediary metabolism is affected. The quantity of incorporated lead can be determined in the blood (not in the serum). The blood sample must be taken from the veins by a one-way plastic needle and mailed in a polyethylene container to an Institute concerned with occupational medicine. A measure for the lead contamination of the body can be obtained by examining the delta-aminolevulinic acid discharge in the urea. Long before clinical symptoms, appear the elimination rate of this substance is markedly higher.

19907 APTIC NO. 38462

Linch, Adrian L., George B. O Connor, John R. Barnes, A. Stanley Killian, Jr., and W. E. Neeld, Jr.

METHYLENE-BIS-ORTHO-CHLOROANILINE (MOCA): EVALUATION OF HAZARDS AND EXPOSURE CONTROL. *Am. Ind. Hyg. Assoc. J., 32(12):802-819, Dec. 1971. 15 refs.*

Following reports of a high incidence of liver cancer in rats exposed to methylene-bis-ortho-chloroaniline (MOCA) in a protein-deficient diet and of lung cancer with MOCA in a normal diet, employees having contact with or exposure to MOCA were examined for adverse health effects. The study included urine analyses using colorimetric techniques and gas and thin-layer chromatography, the evaluation of medical records of employees with 16 yrs exposure experience, and air quality measurements in the manufacturing area. Although urinary excretion of MOCA and certain metabolities by operators and mechanics assigned to the manufacturing area was significant, no manifest signs or symptoms derived from MOCA exposure were noted. The cyanosis-anemia syndrome associated with aromatic amines was absent under the industrial hygiene controls applied in the production area. Airborne MOCA concentrations disclosed by fallout plate, mobile fixed-station, and personnel monitor sampling averaged 0.1-1.2 mg/cu m/day and were, therefore, below levels which could account for the observed urinary output. Skin absorption from direct contact was concluded to be the major source of absorption. Exposure was effectively controlled by efficient precautionary ventilation, respiratory protection, and protective clothing. A threshold limit value for MOCA in air alone would not provide an effective control basis. However, biological monitoring by urine analysis does provide a reliable and expedient control system. (Author abstract modified)

19908 APTIC NO. 38340

Matsuura, Eiji and Takeo Nakagawa

ACTUAL CONDITION AND PROBLEMS OF AIR POLLUTION IN SOUTHERN DISTRICT OF NAGOYA CITY. *(Nagoya-shi nanbu no taikiosen no genjo to mondaiten). Text in Japanese. Nippon Koshu Eisei Zasshi. (Japan. J. Public Health), 18(10):460, 1971.*

A contaminated area due to the electric power industry and the iron and steel industry covers the southern district of Nagoya City. Obstructive respiratory diseases caused by environmental pollution are generally called Shibata asthma in this district, and some cases of death from asthmatic attacks or pulmonary emphysema have occurred for several years, but no definite countermeasure has ever been considered. Close unity of inhabitants would bring the first step for resolution of the pollution problem.

19909 APTIC NO. 37814

Mayer, Peter S. and Arthur E. Savitt

ALLERGIC RHINITIS AND AIR POLLUTION: A DOUBLE-BLIND CROSSOVER ANALYSIS. *Eye Ear Nose Throat Monthly, 51(1):33-37, Jan. 1972. 4 refs.*

A double-blind crossover study comparing two nasal decongestants in 39 patients demonstrated that one of them, dexbrompheniramine maleate with d-isoephedrine sulfate, provided more effective and longer lasting oral therapy in relieving the symptoms of nasal and sinus congestion caused by seasonal or perennial allergic rhinitis. Although it is a subjective impresion on the part of the investigators because of the small number of patients studied, less complaints of drowsiness with this agent would be expected. Such an effect is of particular importance in industrial areas where individuals are working machines and must remain alert. (Author summary modified)

19910 APTIC NO. 38424

McCord, Carey P.

PROPERTIES, PHYSIOLOGY, AND PSYCHOLOGY OF ODORS. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 248 - 249. (May 3-5, Louis C. McCabe, ed.)*

Theories of olfaction, its physiologic basis, methods of odor measurement and classification, and the health and nuisance effects of odors are briefly discussed. Although there exist some 25 or 30 theoretical explanations of the mechanism of odor sensation, there is no method for measuring odors. The Crocker--Henderson classification is at present the most widely accepted of the many systems formulated. Odors do not produce organic disease, although offensive odors may cause nausea; vomiting; and appetite, sleep, breathing, and emotional disturbances. Thus, odors fall into the category of nuisances, affecting either an individual or community, and should be included in any appraisal of air pollution conditions.

19911 APTIC NO. 37987

McEwen, J., Angela Finlayson, Alex Mair, and A. A. M. Gibson

ASBESTOS AND MESOTHELIOMA IN SCOTLAND. AN EPIDEMIOLOGICAL STUDY. *Int. Arch. Arbeitsmed., 28(4):301-311, 1971. 13 refs.*

A retrospective study of the incidence of mesothelioma in Scotland and its association with asbestos is described. For the years 1950-1967, 80 cases were traced from pathological reports and biopsy material of malignant tumors invading the peritoneum and pleura. Detailed histories of residence, occupation, and degree of exposure to asbestos were obtained from relatives or friends for the 80 cases and for two sets of controls matched for age and sex. The incidence of mesothelioma in Scotland was associated with exposure to asbestos and its incidence was similar to that in other areas of Britain. Of the 80 cases, 51 male cases has residential exposure. They lived within 1/2 mile of shipbuilding, docks, or asbestos factories. Most of them had spent more than 30 yrs of their lives in these areas.

19912 APTIC NO. 38364

Misiakiewicz, Zbigniew and Genowefa Szulinska

DETERMINATION OF THE INFLUENCE ON ANIMAL ORGANISM OF A PROLONGED EXPOSITION TO LOW CONCENTRATIONS OF CARBON DISULFIDE (CS2) IN THE AIR. *(Badania wplywu malych stezen dwusiarczku wegla (CS2) w powietrze na organizm zwierzecy przy dlugotrwalej ekspozycji). Text in Polish. Roczniki Panstwowego Zakladu Higi., vol. 22:7-16. 1971. 10 refs.*

The biological effect of carbon disulfide in the air in concentrations of 0.1, 1.0, and 10.0 mg/cu m on white rats was studied in a 6-month continuous exposure of the animals to CS2 in biological chambers. The study included determination of the body weight increase, the concentration of coproporphyrin in the urine, blood cholinesterase activity, aspartate aminotransferase activity, and histopathological analysis at the end of the experiment. Increase in animal body weight was 28, 18, and 12% of the weight increase in a control group for animals exposed to air containing 0.1, 1.0, and 10.0 mg/cu m of CS2, respectively. In the same order, increase in coproporphyrin content in urine was 40, 100, and 346%. Increase in blood cholinesterase activity was 72 and 31% for the group with 10 and 1 mg/cu m of CS2, respectively and 120 and 34% for increase in the activity of blood aspartate aminoesterase of the same groups. No changes were observed in the blood of animals subjected to atmosphere containing 0.1 mg/cu m of CS2. Both 10 and 1.0 mg/cu m CS2 concentrations caused histological changes in animal organs.

19913 APTIC NO. 37891

Miyaji, Kazuma

CLINICAL AND PATHODYNAMICAL STUDY OF PATIENTS OF RESPIRATORY DISEASES DUE TO AIR POLLUTION. (PROBLEMS IN TYPES, ORIGIN, AND TREATMENT OF SO-CALLED YOKKAICHI ASTHMA). *(Taiki osen ni yoru kokyuki shikkansha no rinshobyotaigaku teki kenkyu. (Iwayuru yokkaichi zensoku no byokei, seiin, chiryo no mondai ten)). Text in Japanese. In: A Study of the Administration Method of Medical Care for Sufferers from Public Nuisance in Yokkaichi City. Mie Prefectural Public Nuisance Health and Medical Study Council (Japan), p. 31-52, March 1971. 8 refs.*

The so-called Yokkaichi asthma is divided into illnesses which started before 1965 and those which began afterward. An increase was evident in chronic bronchitis from Aug. 1962, in bronchial asthma from 1960, and in pulmonary emphysema from Aug. 1962. At the time of the onset of the disease, there were many cases which were complicated with asthma. Thus, it seemed that the disease had been developed from the asthma. Though a positive rate of hereditary relationships and reactions to house dust was as low as 20%, when compared with non-polluted districts, in view of findings such as increased eosinophiles, it is certain that the state was allergic. Though the origin was not clear, the processes of the increase in sensitivity of the bronchus-infection of the respiratory tract and then the onset of the disease are suggested, since spasms occur under the contaminated environment. Since smokers are many among patients with pulmonary emphysema, smoking seems to be a factor for developing the disease. In autopsied cases from the non-contaminated and contaminated areas, legions which coincide with hypertrophy of the bronchial sustaining membrane, infiltration of eosinophiles around the bronchus, and break-downs of alveoli of the lung in pulmonary emphysema were evident. In cases in contaminated environments, infiltration of the lymphoid cells and plasma cells around the bronchus and bronchioles was evident. Though the effect of air purification can hardly be recognized in patients who were ill before 1965, patients who developed the disease later may show improvement. Symptomatic treatment with drugs for bronchodilation is often used, but extravagant use of this drug causes damage in pulmonary circulation, causes a burden on the right heart, and becomes a contributing factor for death by asthma, as witnessed in experimentation with rabbits.

19914 APTIC NO. 37993

Miyamoto, Akimasa

AIR POLLUTION AND ALLERGY. *(Taikiosen to arerugi). Text in Japanese. Hoken no Kagaku (Health Care), 13(10):641-643, 1971.*

The relation between respiratory diseases caused by air pollution and allergic disposition was outlined, based on the investigation concerning respiratory diseases and lung function in Yokohama, Kawasaki, Kashiwazaki, and Niigata and the result of some animal experiments. Respiratory diseases often appear among those who have allergic disposition and increase with age. This increasing tendency is more significant in those who have allergic disposition. An inhalation test of protein, histamine, and acetylcholine to animals exposed to contaminated gases showed that air pollution made an allergic reaction occur. But the relation between the mechanism of allergic reaction and air pollution is still obscure.

19915 APTIC NO. 38336

Mizuhara, Hiroshi, Toshiichi Kurono, Hiroshi Hashimoto, Setsuo Takaishi, Hiroyoshi Yoshida, and Kazuko Nakagawa

EFFECT OF AUTOMOBILE EXHAUST GASES ON HUMAN BODY. INVESTIGATION OF 806 RESIDENTS ALONG NATIONAL HIGHWAY ROUTE 26 IN OSAKA. PART 5. FOLLOW UP INVESTIGATION OF THOSE WHO HAVE LOW BLOOD SPECIFIC GRAVITY. *(Jidosha haishutsu gasu no jintai eikyo. Kokudo 26 gou sen. Osakashimin 806 nin no chosa sono 5. Zenketsu teihiju sha o chushin toshita tsuiseki chosa). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):409, 1971.*

A follow-up study to the investigation of Sept.-Oct. 1969, was carried out during Sept. and Oct. 1970. Districts along the national highway route 26 and the districts 50-100 m away from the highway were considered to be exposed and controlled areas, respectively. In the previous study 806 people were examined; here 539 were examined. The blood specific gravity below 1.054 in men and 1.051 in women reached about 50%. Even in the non-smoking group, frequency of low blood specific gravity was high. Compared with the investigation of 1969, those with slight anemia increased two-fold in both exposed and controlled areas.

19916 APTIC NO. 38198

Muench, R., E. G. Beck, and N. Manojlovic

STUDY ON THE REACTION OF CELLS GROWN IN VITRO AFTER BRIEF INCUBATION WITH SILICON DIOXIDE DUST. *(Untersuchungen ueber die Reaktion in vitro gezuechteter Zellen nach kurzzeitiger Inkubation mit Si02-Staub). Text in German. Beitr. Silikose-Forsch (Pneumokoniose), 23(4):174-205, 1971. 20 refs.*

Cell lines L-, Fl-, and HeLa as well as macrophages from guinea pigs were tested to determine the primary effects of silicon dioxide dusts in a serum-free environment on the cell membrane. The primary reaction was increased permeability of the cell membrane, manifested by uptake of acid dyes and liberation of enzymes from the cells. Of the dyes tested, erythrosine B was the most effective. Lactic acid dehydrogenase (LDH) activity in the supernatant medium was measured as an index of enzyme liberation. In the absence of serum, toxic dusts caused a permeability alteration of all tested cells within five minutes after application. The permeability of L-cells increased remarkably. A re-dye effect was also observed with cells of epithelial origin (FL and HeLa). Dusts such as corundum, crystal quartz (KQH), and asbestos did not produce these primary effects. Coating the toxic dusts with various mono and polymer substances prevented changes in cell membrane permeability. The cells themselves were effectively pretreated only with poly (2-vinylpyridine 1-oxide).

19917 APTIC NO. 38459

Nagata, Minoru and Tatsuhiko Tsuji

ABSENCE OF SCHOOL CHILDREN IN AIR POLLUTED REGION - A STUDY BY THE COMMUNITY CHART. *(Taikiosen chiku no gakudo no kesseki ni tuite - Community Chart ni yoru kento). Text in Japanese. Nippon Koshu Eisei Zassi (Japan. J. Public Health), 18(10):421, 1971.*

Rate of absences (1000 persons/day) of children were compared in the elementary schools between the districts with and without factories. They were studied by classification of distances from the factories to school, in order to get a good indicator for the damage to human health during the early stage of air pollution. The rate of absence for three years, 1966-1969, showed a tendency to decrease with age in the controlled school and to increase in the lower classes of observed schools. The difference in the rate was almost in accord with that of acute respiratory diseases such as common cold, asthma, tonsilitis, and pharyngodynia. The observed schools exceeded the controls, when the absence rate increased more than usual in the controls. There were differences of the absence rate in one school by the distance from factories. The absence rate of acute respiratory diseases, especially the common cold, showed a tendency to become higher in the children around the factories.

19918 APTIC NO. 37893

Nakamura, Ryuichi

AN EPIDEMIOLOGICAL SURVEY OF EFFECT OF AIR POLLUTION ON MOTHERS AND THEIR CHILDREN IN YOKKAICHI CITY. *(Yokkaichishi no taiki osen ga boji no oyobosu eikyo ni kansuru ekigakuteki kento). Text in Japanese. 0In: A Study of the Administration Method of Medical Care for Sufferers from Public Nuisance in Yokkaichi City. Mie Prefectural Public Nuisance Health and Medical Study Council (Japan), p. 75-86, March 1971.*

In polluted and non-polluted districts of Yokkaichi City, pregnancy diseases were analyzed statistically concerning the following items: special respiratory diseases during pregnancy, hyperemesis gravidarum and late gestational toxicosis, the number of red cells, the hemoglobin amount, the amount of parturition hemorrhage, the frequency of obsterical operations, the incidence of premature births, and placental weight. Body weight, incidence of immaturity, asphyxia, icterus neonatorum, abnormality of body temperature, and incidences of malformations and still-born children were studied. The significantly high incidences of diseases in the polluted districts was seen in such items as pregnancy respiratory infections, serious icterus neonatorum, and immature and still-born children. High incidences of pregnant anemia, premature births, neonatus pyrexia, neonatus asphyxia, malformation, and increased placental weight were observed. Incidences in non-polluted districts were also noticed in such items as increased amount of parturition hemorrhage, frequency of cesarean section, and decreased neonatural weight. The incidence of hyperemesis gravidarum and late gestational toxicosis were not different in the two districts. A significantly high incidence of still-born children and a high incidence of immature or malformed neonates had an important meaning as one of factors of congenital abnormality. Although impairments of the respiratory system such as the common cold and bronchitis of pregnancy by air pollution did not give direct effects on fetus, it was considered that antibiotics and anti-cough agents might give secondary impairments when treated for a long term.

19919 APTIC NO. 38109

Nakamura, Ryuichi

AIR POLLUTION AND PREGNANCY. *(Taikiosen to ninshin). Text in Japanese. Nihon Iji Shinpo (Jap. Med. J.), no. 2481:18-29, Nov. 1971. 23 refs.*

The influence of sulfur dioxide pollution in Yokkaichi city on pregnant women, fetuses, and new born babies was examined at Shiohama Hospital. The concentration of SO2 tends to increase every year, not only in the polluted area but also in the unpolluted area of the city. Impairment of respiratory organs tended to be seen more among the pregnant women in the polluted area, but no such serious impairment of respiratory organs as bronchial asthma was observed at all. The rate of serious case of morning sickness was the same in both areas, and slight cases were observed even more among pregnant women in the unpolluted area. The high rate of pregnancy toxemia and premature birth was observed among pregnant women in the polluted area, but it was not statistically significant. Thus, despite the fact that the unpolluted area includes some rural communities where premature births have been more frequent, a reverse tendency was seen; that is, there are more premature births in the polluted area which includes more urban districts. This creates doubt that the tendency is caused by air pollution. Concerning new born babies and fetuses, no evidence of impairment caused by air pollution was observed, but more premature babies, especially babies with fever of the febrile condition was observed in the polluted area. However, according to the Yokkaichi Health Center report, the still-birth rate in the polluted area was significantly high during 4 consecutive yrs since 1963.

19920 APTIC NO. 38362

Niedig, G. von and H. Krekeler

PROTECTIVE ACTION OF ATROPIN, MECLASTINE AND ORCIPRENALINE ON PROVOCATION TESTS WITH NO2 IN HEALTHY SUBJECTS AND PATIENTS WITH CHRONIC NON-SPECIFIC BRONCHITIS. *(Pharmakologische Beeinflussung der akuten NO2-Wirking auf die Lungenfunktion von Gesunden und Kranken mit einer chronischen Bronchitis). Text in German. Int. Arch. Arbeitsmed., 29(1):55-63, 1971. 23 refs.*

It is not known which mechanism causes the changes of respiration gas exchange and airway resistance at the inhalation of small concentrations (less than 10 ppm) of nitrogen dioxide. In order to find this out, the protective action of atropine, meclastine, and orciprenaline was examined in 14 healthy persons and 23 patients with chronic non-specific bronchitis breathing an NO2-air mixture with 5 to 8 ppm NO2. The examinations were carried out on four successive days at the same hour of the day. The Saltzman method was used for the analysis of NO2. A pronounced protection against the effects of NO2 on the respiratory gas exchange and the airway resistance was provided only by meclastine, an antihistamine. Therefore, NO2 acts by release of histamine causing a bronchiolar, alveolar, and interstitial oedema. The airway resistance of the bronchitis patients was more than 5 cm H2O/l/sec, that of the healthy patients 2 cm H2O/l/sec prior to NO2 inhalation. After NO2 inhalation the airway resistance in healthy persons rose by 0.565 cm H2O/l/sec or by 41.7% in bronchitis patients by 1.046 cm H2O/l/sec or by 17.7%.

19921 APTIC NO. 38243

Panzani, R.

ATMOSPHERIC POLLUTION ASSOCIATED WITH ALLERGENS. *(Pollution atmospherique liee aux allergenes). Text in French. Agressologie, 12(D):47-48, 1971.*

General problems of atmospheric pollution associated with pneumo-allergens, and related investigations in Marseille (France) are reviewed. In Marseille, ideal for the occurrence of allergy due to its specific climatic and geographical conditions, primarily pulmonary ventilation manifestations were observed. Several allergens were investigated in cutaneous tests, and the diagnoses were confirmed by the Allergic Transfer Test in many cases. The effects of ricin and ricin seeds were observed on over 500 sensitive persons. Ricin seeds and pollens of ricin and other Euphorbiceae showed a combined allergenic effect. Green coffee beans showed an allergenic effect while no such effect existed in roasted, i.e., dry, coffee. Most of the persons investigated showed panallergy towards insects such as arthropoda. Also atmospheric molds (aspergillus, penicillium) were investigated for allergenic action. Dusts from wheat were the most important of all cereals. Peas, lentils, and beans were most allergenic of all the dried vegetables investigated.

19922 *APTIC NO. 38391*

Pooley, F. D., P. D. Oldham, Chang-Hyun Um, and J. C. Wagner

THE DETECTION OF ASBESTOS IN TISSUES. Pneumoconiosis, Proc. Int. Conf., 3rd, Johannesburg, South Africa, 1969, p. 54-67. 3 refs. (April 24-May 2.)

The present incidence of asbestos in the lungs of the general population in major urban areas and the general changes in incidence were examined. A model for secular changes in the incidence of asbestos bodies in the lungs was constructed and determined a fair agreement between observed and expected numbers positive. Pathological techniques and results in the determination of fibers and asbestos bodies are reviewed. Incidence of the bodies was given by age group and sex.

19923 APTIC NO. 38092

Prisyazhnyuk, V. E.

A STUDY OF THE TOXIC ACTION ON THE BODY OF THE JOINT PRESENCE IN THE ATMOSPHERE OF VINYL ACETATE AND ACETALDEHYDE. *(Izucheniye toksicheskogo deystviya na organism odnovremenno prisutstvuyushchikh v atmosfernom vozdukhe vinilatsetata i astsal degida). Text in Russian. Gigiena i Sanit., vol. 12:13-16, March 9, 1972. 10 refs.*

The effect of short-term exposure to various concentrations of a mixture of vinyl acetate and acetaldehyde vapors on the reflex activity of man was investigated. A chronic poisoning test revealed no noxious effect if the total concentratons of vinyl acetate and acetaldehyde vapors in air did not exceed the maximal permissible concentration of each individual substance. These concentrations are based on the following threshold concentrations: vinyl acetate, 0.22 mg/cu m (subthreshold, 0.15 mg/cu m); acetaldehyde, 0.013 mg/cu m (subthreshold, 0.010 mg/cu m).

19924 APTIC NO. 38027

Reichel, G.

ENVIRONMENTAL FACTORS AND RESPIRATORY TRACT DISEASES. *(Umwelteinfluesse und obstruktive Atemwegerkrankungen). Text in German. Schweiz. Med. Wochenschr. (Basel), 102(4):102-109, 1972. 63 refs.*

Sudden changes of temperature, extreme dust exposure, tobacco smoke, fog, and irritating gases may cause obstructive bronchial diseases. This reaction is commonly demonstrable in subjects with hypersensitive bronchial systems and assumed to be exposed to high concentrations of injurious substances. Exposure to such high concentrations of atmospheric pollutants is not normally observed in large cities. Objective lung functions results and subjective symptoms in 8162 persons in an epidemiological field study in the Ruhr area did not reveal any relation between incidence of bronchitis and the mean daily high and low values of airborne fine dust. Also, there were no differences between small towns, big cities, and rural areas in respect of probability of unspecific bronchial diseases. Between 1965-1966, the sulfur dioxide and airborne dust concentrations in the Ruhr were 0.03-0.3 ppm and 0.001-0.39 mg/cu m, respectively; these concentrations obviously exerted no bronchial-irritating or bronochoconstrictive effects.

19925 APTIC NO. 38700

Roehm, Jeffrey N., John G. Hadley, and Daniel B. Menzel

THE INFLUENCE OF VITAMIN E ON THE LUNG FATTY ACIDS OF RATS EXPOSED TO OZONE. *Arch. Environ. Health, 24(4):237-242, April 1972. 20 refs.*

The effect of vitamin E on ozone toxicity was investigated by continuous exposure of rats fed a defined diet. Dietary supplementation with 100 mg of vitamin E per kilogram of diet extended the lethal time for 50% survival of rats exposed continuously to 1.0 ppm ozone from 8.2 days to 18.5 days. Exposure to 0.5 ppm ozone resulted in pulmonary edema and mortality in vitamin E-depleted rats after six weeks. Associated with the toxic symptoms in both experiments were an increase in arachidonic and palmitic acids and a decrease in oleic and linoleic acids. These changes were similar to those observed in lungs of vitamin E-depleted air-exposed rats and suggest that the cellular effect of ozone is merely an acceleration of the molecular events of vitamin E deficiency. (Author abstract modified)

19926 APTIC NO. 38193

Rose, Earl F. and Marilyn Rose

CARBON MONOXIDE: A CHALLENGE TO THE PHYSICIANS. *Clin. Med., 78(8):12-21, Aug. 1971. 44 refs.*

Carbon monoxide, as ubiquitous as the cigarette and the automobile, is the greatest pollutant of the lower atmosphere. Exposure to low concentrations of atmospheric CO, either acutely or over a period of time, may be a significant factor in both industrial and automobile accidents. The signs and symptoms of acute CO intoxication increase in magnitude and severity with rising levels of CO as carboxyhemoglobin (COHb). A 10-20% COHb is associated with mild headaches and vasodilation, and measurable losses in muscular coordination, reaction time, and sensory perception. At 25-35% COHb a state of anoemia exists which is aggravated by muscular altitude, disease, and drugs. At over 40% there is a probability of collapse and death; at more than 60% COHb death is imminent. Chronic CO intoxication from low atmospheric levels may diminish efficiency and performance capabilities, and cause a variety of symptoms while masquerading as neurosis or organic disease. The more common symptoms are anorexia, nausea, apathy, fatigability, insomnia, and headaches. All CO poisonings must be vigorously treated with 100% pure oxygen -- under hyperbaric conditions where possible.

19927 APTIC NO. 37844

Schaer, M.

EPIDEMIOLOGICAL ASPECTS OF RESPIRATORY DISEASES. *(Epidemiologische Aspekte der Atemorganerkrankungen). Text in German. Schweiz. Med. Wochenschr. (Basel), 102(4):114-116, Jan. 1972.*

In view of the fact that humans daily inhale about 10 cu m air, it seems to be justified to take air pollutants into consideration as possible causes for diseases of the respiratory tract. Statistical studies carried out in rural areas of Great Britain with no air pollution and in industrial areas with high air pollution revealed that the morbidity rate of chronic bronchitis lies between 1 and 15% in rural areas and between 7 and 20% in air-polluted areas. In London, a connection between the sulfur dioxide concentration, the soot concentration, and the excess mortality was found. A study in Philadelphia revealed that the morbidity rate of employees was positively correlated with wind direction and speed, the smoke content, and the concentration of particulates and sulfur dioxide. None of these substances was correlated with the higher morbidity on an individual basis, i.e., sulfur dioxide alone affects the bronchi only in high concentrations. Workers in industrial plants exposed to 5 ppm SO2 showed no visible signs of any affliction, while the bronchtis morbidity rate rose already at a concentration of 1 ppm SO2 in the ambient air. Asthma was also correlated with the degree of air pollution. In Nashville, 3600 asthma cases were found among 27,000 persons examined. The lung cancer morbidity rate and the degree of air pollution are also closely connected. Polycyclic hydrocarbons are important causes of cancer.

19928 APTIC NO. 37805

Schnitzer, R. J. and F. L. Pundsack

ASBESTOS HEMOLYSIS. *Environ. Res., 3(1):1-13, 1970. 10 refs.*

Chrysotile fibers exert a marked hemolytic activity on suspensions of washed sheep erythrocytes, but amphibole asbestiform minerals such as crocidolite, amosite, tremolite, and anthophyllite possess only negligible hemolytic properties. The minimal hemolytic concentration of chrysotile asbestos is dependent on the openness of the fibers as characterized by the air permeability surface area and decreases with increasing surface area. Chrysotile hemolysis can be inhibited by disodium ethylenediaminetetraacetic acid and by certain acidic polymers, particularly by polystyrene sulfonates, carboxymethylcellulose ether sodium salts, and the pyran-copolymer NSC 46015. The hemolytic action of chrysotile can be markedly reduced by repeated treatment with red blood cells. The role of the magnesium hydroxide surface characteristic for chrysotile is not yet elucidated, because magnesium hydroxide is not hemolytic, although nemalite, a natural fibrous magnesium hydroxide, and a lightly burned magnesium oxide are active hemolytic agents. (Author abstract modified)

19929 APTIC NO. 38392

Selikoff, I. J. and E. Cuyler Hammond

ASBESTOS BODIES IN THE NEW YORK CITY POPULATION IN TWO PERIODS OF TIME. *Pneumoconiosis, Proc. Int. Conf., 3rd, Johannesburg, South Africa, 1969, p. 47-53. 26 refs. (April 24-May 2.)*

Autopsies in New York City were examined to determine the distribution of asbestos bodies in 1966-1968 and 1934. There was no significant difference in the percentage of cases having asbestos bodies in 1967 or 1934. Asbestos bodies were not randomly distributed among the general population, but were correlated with occupational exposure. The construction and ship building industries are rich potential sources of direct and indirect occupational asbestos exposure. Measurement data with respect to age, sex, and occupation are presented.

19930 APTIC NO. 38394

Selikoff, Irving J., E. Cuyler Hammond, and Jacob Churg

MORTALITY EXPERIENCES OF ASBESTOS INSULATION WORKERS 1943-1968. *Pneumoconiosis, Proc. Int. Conf., 3rd, Johannesburg, South Africa, 1969, p. 97-103. 18 refs. (April 24-May 2.)*

The case histories of asbestos workers in the New York area were investigated to determine mortality rate among asbestos insulation workers. Data were correlated with asbestos use, kind of cancer, duration of occupational exposure, age, effects of cigarette smoke, and fiber variety. One in every five deaths was caused by lung cancer; 22 of the 380 deaths were due to pleural (6) and peritoneal (16) mesothelioma. The balance of deaths was due to gastrointestinal cancer (37), oropharynx larynx cancer (5), cancer of the pancreas (3), asbestosis (30), and other neoplasms (19). Projected and actual deaths before and after 20 yrs of exposure were compared.

19931 APTIC NO. 37936

Sherwin, Russell P., Janice Dibble, and John Weiner

ALVEOLAR WALL CELLS OF THE GUINEA PIG. INCREASE IN RESPONSE TO 2 PPM NITROGEN DIOXIDE. *Arch. Environ. Health, 24(1):43-47, Jan. 1972. 6 refs.*

The ratios of lactate dehydrogenase-positive alveolar wall cells (primarily type 2 pneumocytes) to alveoli were determined for the lungs of control and exposed (continuous 2 ppm nitrogen dioxide) guinea pigs. The study was divided into three exposure periods of one, two, and three weeks with four pairs of control and exposed animals evaluated for each period. Disturbances in the microecological aspects of cells of the lung were tentatively indicated secondary to, but not specific for, NO2 exposure. With the support of other studies, it is further indicated that type 1 cells are being replaced by type 2 cells. (Author abstract modified)

19932 APTIC NO. 37917

Shigematsu, A., M. Toyohara, and T. Iwasaki

A TRACER TECHNIQUE FOR THE BEHAVIOUR OF DUSTS IN EXPERIMENTAL ANIMAL LUNGS USING AN AUTOMATIC AIR POLLUTION REPRODUCER AND A FILM SCINTILLATION COUNTER. *Nucl. Instr. Methods, 86(2):279-284, Sept. 15, 1970. 4 refs.*

A tracer technique using an air pollution reproducer and a film scintillation counter is described for measuring, the radioactivities of homogeneous dusts (carbon 14-charcoal, C14-methylcholanthrene, and sulfur 35-sulfur dioxide) and heterogeneous dusts (C14-methylcholanthrene-silica and S35-sulfur dioxide alumina) in mice lungs. The experimental apparatus consists of an air supplier thermostatically controlled, high voltage air cleaner, an animal air chamber, three dust reproducers regulated by a radioactivity monitoring system, a cleaning and washing system for decontamination, and an exhaust system. Use of a dust labeled with soft beta emitter and application of a monitoring system in a radio-liquid-gas chromatograph gave an effective and simple feedback control system to maintain the designated concentration in the animal air chamber. Charcoal dust stayed in mouse lungs for a considerably long period, while MC powder and SO2 gas were removed quickly from the lungs. On the other hand, when MC was adsorbed on silica and SO2 on alumina, they showed a similar behavior to the charcoal dust in the lungs. (Author abstract modified)

19933 APTIC NO. 38656

Shigematsu, Itsuzo, Hiroshi Hirayama, Takeo Suzuki, Yuu Hirayama, Aysushi Otani, Hirotatsu Suganuma, and Tokio Fujimaki

STUDIES OF INCIDENCE OF TUBERCULOSIS AND NON-TUBERCULOSIS LUNG DISEASES AND SUBJECTIVE SYMPTOMS DIVIDED ACCORDING TO THE DEGREE OF AIR POLLUTION. *(Taikiosen (kokabaijin ryo, iousankaoutsu) no teido betsu, kekkakusei hi-kekkakusei haishikkan narabi ni jikakusho shutsugen ritsu no kento). Text in Japanese. 10p., 1971 (?).*

The prevalence rate of non-tuberculosis lung diseases was studied in 2702 inhabitants of 13 severely polluted districts and 2431 inhabitants of 13 non-polluted districts. In the same way the rate of previous medical histories with lung or heart disease and the rate of subjective symptoms such as cough and sputum were studied in the inhibitants over 30 yrs old. In 14,680 inhabitants of 80 severely polluted districts, the prevalence rate of bronchiectasis, pulmonary fibrosis, and chronic bronchitis was examined. The results of studies on non-tuberculosis lung diseases were as follows: 0.2% (six persons) bronchiectasis in polluted districts and 0.3% (eight persons) in non-polluted districts, and pulmonary fibrosis and chronic bronchitis showed less than 0.1% in both districts. The rate for subjects over 30 yrs old were corrected for sex and age. Men with a tuberculosis history were 28% in polluted districts and 12% in non-polluted districts. Women with a tuberculosis history were 25% in polluted districts and 12% in non-polluted districts. There was no significant difference between both districts in regard to chronic bronchitis, pneumonia, and cardiac diseases. The presence of sputa were reported by 7% of the men in polluted districts, 4% of the men in non-polluted districts, 3% of the women in polluted districts, and 1% of the women in non-polluted districts. No difference was observed between both districts on cough, pain in the chest, and asthma. Abnormality in the chest x-ray film showed men in polluted districts had a high incidence of nodular and streaky shadows at all ages, but no difference was seen in women of both districts. Emphysema incidence was slightly high in both men and women in polluted districts.

19934 *APTIC NO. 38328*

Shimazaki, Yasuie, Kenji Kajita, and Sadamoto Sakasegawa

STUDIES ON THE TOXICITY OF CO GAS. (CO gasu no dokusei ni kansuru kenkyu). Text in Japanese. Nihon Jui Chikusan Daigaku Kiyo (Bull. Nihon Vet. Zootech. Coll.), (20):30-38, 1971. 17 refs.

In order to set up the standard of toxicity determination and the maximum allowable concentration of carbon monoxide, experiments were made to estimate the toxicity of CO inhaled by mice and rabbits. The lethal product (concentration (%) times time to death (min)), intoxication index (concentration (%) times time until symptoms occur (min)) and the 50% lethal concentration (LC50) were estimated. Further studies were made on the effect of oxygen deficiency upon animals in terms of time until symptoms occur and seven stages of symptoms (slackness, crouching, ventral posture, agony, paralysis, cramp, and recumbency) by LC50 experiments making the 02 concentration as low as 15-18%. The hematological characteristics of rabbits suffering from CO poisoning were studied, estimating pH of the blood plasma by means of BTB test paper and blood coagulation time by means of the Lee-White method. The symptoms frequently observed in mice were cramps, crouching, ventral posture, and recumbency, and those in rabbits were ventral posture, agony, cramps and recumbency. Of most of the 33 dead mice, the lethal product was 5-15, and the average lethal product was 38.6 in eight rabbits. The LC50 of CO in mice was 0.28% by a base of commercial air and 0.53% by a base of mixed air of commercial 02 and nitrogen; that in rabbits was 0.83% by a base of mixed air. The hygienic standard of the environment for man might be under 8 ppm/hr of CO, on the basis of the experimental data obtained by multiplying the LC50 of CO in rabbits by 1/1000, as a safety coefficient. It was 3-5 ppm for mice and 8.3 ppm for rabbits. The average pH of the plasma of rabbits suffering from the effect of CO was about 0.73 lower than that of the controls. The average blood coagulation time of the same rabbits was 1.18 minutes longer than that of the controls.

19935 APTIC NO. 37959

Shinozaki, Yoshitsugu, Tatsuhiko Tsuji, and Minoru Nagata

EFFECT OF AIR POLLUTION WITH HYDROGEN CHLORIDE GASES ON THE INHABITANTS HEALTH. 1. AN INVESTIGATION ON THE SYMPTOMS OF RESPIRATORY ORGANS. *(Enkasuiso gasu o fukumu taikiosen no jumin no kenko ni oyobosu eikyo. 1. Kokyuki shojo chosa). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):425, 1971.*

An investigation of respiratory symptoms was carried out in an air polluted region around factories and a region without air pollution in order to see the summated effect on the human body of exhaust gases and dusts from chemical factories in the southern section of Shibukawa city, Gunma Prefecture. The type of exhaust gases and the highest concentration (value/hr) identified were chlorine, 0.01 ppm; hydrogen chloride, 0.9 ppm; and sulfur dioxide, 0.05 ppm. The rate of asthma with difficult breathing in the observed region was higher than that of the controls in both boys and girls in three-year-old children, and children attending kindergarten and nursing schools. The British Medical Research Council inquiry was made for adults over 40 years of age. From the results, Q-5 to Q10 showed a higher rate in the observed group, particularly the group 40-49 years old. This tendency was not seen in females.

19936 APTIC NO. 37960

Shishido, Masao, Terumichi Sugita, Fumio Higuchi, Tokuji Saito, Masaki Kobayashi, Yoriki Yamamoto, Yoshio Nakamura, Mitsukane Hino, Nobuhiko Sukegawa, and Katsumi Saruta

RELATIONSHIP BETWEEN DISTURBANCES OF CHILDREN S HEALTH AND AIR POLLUTION. 2. COMPARISON OF INVESTIGATIONS BETWEEN 1968 AND 1971. *(Shoni no kenkoshogai to taikiosen tono kankei. Dai 2 ho Showa 43 nen to showa 46 nen no chosa no hikaku). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):419, 1971.*

An investigation of 22530 kindergarten children, composing 19640 collections at a collection-rate of 87.2% was conducted in five places classified by sulfur dioxide concentration (less than 0.3, 0.3-0.5, 1.0-1.5, and more than 1.5 mg) was made in Yokohama on the following items: being apt to catch a cold, have a sore throat, have sore eyes, become feverish, have a stomach ache, and if a fit of asthma had been experienced during the past year and whether diagnosis such as tuberculosis had been made. Complaint such as being apt to catch a cold, have a sore throat, and have sore eyes showed a higher rate in males than in females. The complaint rate of a fit of asthma was extremely high where more than 1.5 mg of SO2 concentration existed as compared with the investigation in 1968. There was a statistically significant difference between this and other places.

19937 APTIC NO. 38395

Sluis-Cremer, G. K.

ASBESTOSIS IN SOUTH AFRICAN ASBESTOS MINERS. *Environ. Res., vol. 3:310-319, 1970. 5 refs.*

Asbestosis in South African Caucasian miners working on the northwest Cape and the Transvaal mines between 1954-1958 was investigated. Both length of asbestos exposure and residence of asbestos in the lungs were factors of importance in determining the onset of asbestosis. No person in the study group starting work after 1950 developed bronchial carcinoma or mesothelioma of the pleura. A high incidence of minimal asbestosis was determined in Bantu laborers. The lesions were, for the most part, of no clinical significance, although some, with time and in the absence of further exposure, could probably progress to clinically significant diseases. Dust concentrations in asbestos mines, autopsy data, and lung function tests are also mentioned. (Author abstract modified)

19938 APTIC NO. 37896

Sugimoto, Toshi, Koichi Matsuo, Ko Nakayama, Akimasa Nishimura, and Masakazu Yamada

INVESTIGATION ON VARIOUS KINDS OF RESPIRATORY DISEASE WHICH WAS EXAMINED BY THE MEMBERS OF THE YOKKAICHI MEDICAL ASSOCIATION AND SUPPOSED TO BE AFFECTED BY AIR POLLUTIONS. *(Yokkaichi ishikaiin no shinryo shita taiki osen no eikyo no aru to omowareru kokyuki shikkansha no chosa kenkyu). Text in Japanese. In: A Study of the Administration Method of Medical Care for Sufferers from Public Nuisance in Yokkaichi City. Mie Prefectural Public Nuisance Health and Study Council (Japan), p. 131-152, March 1971.*

The morbidity of chronic obstructive respiratory disease (bronchial asthma, chronic bronchitis, asthmatic bronchitis, and pulmonary emphysema) at a polluted area and a non-polluted area in Yokkaichi from 1967 to 1970 was reported. A significant difference was observed between Shiohama (a polluted area) and the other areas. The morbidity at the former area was twice to three times that at the others. Results of the investigation from May 1970 to Jan. 1971 were shown.

19939 APTIC NO. 38106

Takizawa, Yukio, Koji Sato, Tatsuo Oshina, and Ryuichi Sugai

EFFECT OF AIR POLLUTION CAUSED BY FLUORIDES ON HUMAN BODIES. *(Fukkabutsu ni yoru taikiosen no jintai ni oyobosu eikyo ni tsuite). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):428, 1971.*

At the Naoetsu coastal factory area, an aluminum refinery with an annual product of about 150,000 tons has been in operation since May, 1963. The results of mass medical examinations conducted for the inhabitants of over 40 yrs old who had been living in the area within 1 km from this refinery for more than 5 yrs (Naoetsu area-708, Kubiki area-444, and control area-93, amounting to 1245 in total) are briefly reported here. For the investigation, examinations of subjective symptoms, general medical and dental examinations, respiratory function tests, and urine tests were conducted in Nov. 1970, and in March 1971, tests for basal metabolic rate, bone examinations by X-ray, electrocardiography and functional tests of blood and enzymes were carried out. The amount of urinal F was 0.574 ppm on the average in 62 people of controlled group, and with a screening standard of 1.2 ppm, the number of high excreters became 107; and it was significantly high in contaminated area. Proliferation or calcification of bone was also evident, but there was no areal difference, and there was no osteosclerosis nor spotted teeth. Findings in chest X-ray tests revealed a high rate of pulmonary fibrosis.

19940 APTIC NO. 38398

Thomson, J. G.

THE PATHOLOGICAL DIAGNOSIS OF MALIGNANT MESOTHELIOMA OF PLEURA AND PERITONEUM.

Pneumoconiosis, Proc. Int. Conf., 3rd, Johannesburg, South Africa, 1969, p. 75-79. 10 refs. (April 24-May 2.)

Difficulties in the pathological diagnosis of malignant mesothelioma of the pleura and peritoneum are considered. Based on 17 autopsies and over 50 positive biopsies, heretofore established criteria for diagnosis are reexamined. The diagnoses should be made on morbid anatomical and histological grounds. In any individual case, the absence of a history of exposure to asbestos, the failure to demonstrate pulmonary asbestosis, or to demonstrate asbestos bodies in the lung should not be regarded as in any way invalidating the diagnosis. Similarly, quite extensive involvement of the lung or of other tissues or organs is not against the diagnosis of malignant mesothelioma, provided the histological appearances are typical. (Author conclusions modified)

19941 APTIC NO. 37789

Tomingas, R., W. Dehnen, H. U. Lange, E. G. Beck, and N. Manojlovic

THE METABOLISM OF FREE AND SOOT-BOUND BENZO(A)PYRENE BY MACROPHAGES FROM GUINEA PIGS IN VITRO.

(Die Metabolisierung von freiem und russgebundenum Benzo(a)pyren durch Meerschweinchenmakrophagen in vitro). Text in German. Zentralbl. Bakteriol., Parasitenk. Infektionskr. Hyg.: Abt. 1: Orig., Reihe B, vol. 155:159-167, 1971. 13 refs.

The characterization and identification of the metabolite formed by benzo(a)pyrene (benzo(3,4)pyrene) by macrophages is described. The metabolite produced by the incubation of benzo(a)pyrene with liver microsomes served as the reference material. This product was extracted and purified by thin layer and paper chromatography. The fluorescence spectra of the separated metabolite and the alkaline extract were determined. According to published data, the product is 3-hydroxybenzo(a)pyrene. The products obtained from incubation of guinea pig macrophages with benzo(a)pyrene were extracted in an identical procedure. The fluorescence spectrum of the chromatographically separated spots was not obtainable because of the small amounts of metabolites. However, the fluorescence spectra of alkaline extracts from microsomes and macrophages showed identical products. Moreover, unstable intermediate metabolites were formed by microsomes and peritoneal macrophages. The products differed in their excitation spectra and disappeared after some hours. Thus the metabolite formed by macrophages from benzo(a)pyrene is 3-hydroxybenzo(a)pyrene.

19942 APTIC NO. 38540

Tomingas, R., H. U. Lange, E. G. Beck, N. Manojlovic, and W. Dehnen

THE ELUTION OF BENZO(A)PYRENE ADSORBED ON PARTICULATES BY MACROPHAGES CULTURED IN VITRO.

(Die Abloesung von an Staub adsorbiertem Benzo(a)pyren durch in vitro gezuechtete Makrophagen). Text in German. Zentralbl. Infektionskr. Bakteriol., Parasitenk. Hyg.: Abt. 1: Orig., Reihe B, vol. 155:148-158, 1971. 7 refs.

The ability of macrophages to elute benzo(a)pyrene (benzo(3-4)pyrene) adsorbed from carbon blacks, hematite, and melting-furnace dust was investigated. The particulates were extracted with benzene, dried, and then charged with benzo(a)pyrene. Guinea pig macrophages were cultured in NCTC 109 with 10% guinea pig serum. Incubation was carried out in bottles containing 8 million and 5.2 million peritoneal and alveolar macrophages, respectively. The macrophages were incubated, at 37 deg in the dark, with NCTC 109 in which the carbon blacks and dusts were suspended. Incubation was stopped after 1, 3, and 20 hr by the addition of ethanolic potassium hydroxide. The solids were separated from the medium and the rest of the benzo(a)pyrene was determined by fluorescence spectroscopy. Cytotoxicity was estimated by staining the cells with Erythosin B, measuring LDH-activity in the supernatant, and determining lactate production. Although the elution rate was different, both alveolar and peritoneal macrophages eluted benzo(a)pyrene adsorbed on carbon blacks and dusts. Smaller amounts were eluted from carbon blacks with particle size less than 10 nm than from coarse-grained blacks. Hematite behaved like a fine-grained carbon black. The least benzo(a)pyrene was eluted from furnace dust. Flammruss and furnace dust were distinctly cytotoxic. A relation between cytotoxicity and elution of benzo(a)pyrene was not evident.

19943 APTIC NO. 38707

Trams, Eberhard G., Carl J. Lauter, Elise A. Brandenburger Brown, and Oscar Young

CEREBRAL CORTICAL METABOLISM AFTER CHRONIC EXPOSURE TO OZONE.

Arch. Environ. Health, vol. 24:153-159, March 1972. 35 refs.

The effect of chronic exposure to ozone on cerebral cortical metabolism in dogs was studied to explain the increased latency of evoked electroencephalogram potentials of visual cortex observed after prolonged exposure. Portions of the occipital and parietal cortex were analyzed from 44 dogs exposed to 1-3 ppm 03 for 18 mo. Contents of norepinephrine, epinephrine, lipid hydroperoxides, and potassium, sodium, and chlorine ions were measured; activity was determined for monoamine oxidase, catechol-O-methyltransferase, cholinesterase, 5-nucleotidase, and sodium, potassium, and magnesium adenosine triphosphatases. Catechol-O-methyltransferase activity declined steadily as the daily exposure to 1 ppm 03 was increased from 8 to 24 hr; concurrently, catecholamine content of the tissues also declined. (Author abstract modified)

19944 APTIC NO. 38561

Truhaut, Rene

THE PROBLEM OF PERMISSIBLE LIMITS OF POTENTIALLY TOXIC SUBSTANCES IN THE WORKING AND GENERAL ENVIRONMENT OF MODERN MAN.

(Le probleme des limites admissibles pour les polluants de l air). Text in French. Prod. Probl. Pharm., 26(8):530-548, 1971. 47 refs.

The nature of the risks to human health from exposure to airborne pollutants is outlined with emphasis on the long-term risks, including potential carcinogenicity. The methodology for evaluating these risks is critically examined and the selection of adequate criteria for establishing toxicity thresholds is stressed. The application of permissible limits (threshold limit values, maximum allowable concentrations, ceiling values, emergency exposure limits) for toxic substances in working environments to general community air pollution is discussed. Approaches taken in several countries are indicated. The limits present problems due to the complexity of urban air pollution, the frequent chemical modifications of pollutants by a number of environmental factors, and social and economic imperatives. The importance to toxicologists of adequate pollutant analytical methods calls for a close liason between them and analysts. There is also a need for active international cooperation in studies to establish toxicity thresholds and permissible limits for the guidance of industry and sanitary authorities.

19945 APTIC NO. 37941

Tsuchiya, Kenzaburo

EFFECT OF LEAD IN AIR ON HUMAN BODIES. (INTERIM REPORT). *(Taiki chu namari no jintai ni taisuru eikyo. (Chukan hokoku)). Text in Japanese. Kankyo Hoken Reporto (Environ. Health Rept.), no 5:45-46, Oct. 1971.*

Since July 1970, lead content in urine and hair, delta aminolevulinic acid in urine, and coproporphyrin has been estimated in 60 children of an urban elementary school. The effect of lead (average 2-3 micrograms/cu m) in air appears as a fluctuation in the measured value. The delta aminolevulinic acid level in urine tends to become high in winter and coproporphyrin also becomes high during January through March. But a significant difference from control group was not found. The average value of coproporphyrin in the control group was higher, but a significant difference was not seen. Data of lead content in urine and hair is now being prepared for publication. As seen from the enzymatic disturbance of heme synthesis by lead, it is difficult to say that children in urban districts are affected by lead in air.

19946 APTIC NO. 38582

Tsunetoshi, Y., T. Shimizu, H. Takahashi, A. Ichinosawa, M. Ueda, N. Nakayama, and Y. Yamagata

EPIDEMIOLOGICAL STUDY OF CHRONIC BRONCHITIS WITH SPECIAL REFERENCE TO EFFECT OF AIR POLLUTION. *Int. Arch. Arbeitsmed., 29(1):1-27, 1971. 18 refs.*

A 7-year study (1962-1969) was carried out in Osaka and Hyogo prefectures to clarify the relation between air pollution and chronic bronchitis. Questionnaires based on the British Medical Research Council Committee standard were distributed to 36,374 residents over 40 yrs of age in nine areas representing different degrees of air pollution. The response rate to the questionnaires was 85.9%. Respondents with chronic bronchitis, as defined by Fletcher, were examined by doctors, given chest X-rays, pulmonary function tests, and other medical tests. A group of apparently normal subjects and some with less severe symptoms of sputum, cough, and shortness of breath received a similar medical check-up. The prevalence of chronic bronchitis increased with age and amount of smoking for both sexes and also with an increase in air pollution, especially sulfur dioxide pollution. A formula was derived showing the relation between age, smoking habits, air pollution, and the prevalence of chronic bronchitis. According to the formula, the prevalence of chronic bronchitis in Osaka City will increase by about 2% with a 1 mg/100 cu m/day increase in SO_2 concentrations of 1.0 mg/day or more. When SO_2 is under 1.0 mg/day, the prevalence of chronic bronchitis is independent of air pollution.

19947 APTIC NO. 38655

Untea, G., G. Bercu, M. Paraschiv, and I. Stefanescu

PHYSIOPATHOLOGICAL EFFECTS AND TOLERANCE PHENOMENON CONNECTED WITH EXCESSIVE ATMOSPHERIC CONCENTRATIONS OF SULFUR DIOXIDE. *(Effets physiopathologiques et phenomene d accoutumance lies a des concentrations atmospheriques excessives d anhydride sulfureux). Text in French. Arch. Maladies Profess. Med. Trav. Securite Sociale (Paris), 31(9):481-484, Sept. 1970. 3 refs.*

Fifteen workers employed by a small chemical shop in a Tirgoviste, Rumania, manufacturing a laundry bleach were periodically examined and the physiopathological effects of exposure to high concentrations of sulfur dioxide were recorded. The manufacture involved the calcination at 750 C of a mix containing 25% sulfur in enclosed premises which had only natural ventilation. The workers were exposed to variable concentrations of S02 (between 70.4 and 184 mg S02/cu m air) during their entire work shift over periods exceeding 6 yrs. The workers were equipped with face masks but did not wear them because of the inconvenience involved. All exposed workers manifested lacrimation, 85% workers had excessive salivation, 70% had nasal hypersecretion. Seventy percent felt a burning sensation on the exposed parts of the body as well as in the respiratory tract; 74% complained of a painful cough with excessive expectoration. A cytological examination of the sputum revealed pathological elements testifying to local inflammatory processes. Pulmonary ventilation of 75% workers was characterized by polypnea during the latter half of the work shift with recovery following the end of work. Lung X-rays of workers exposed for more than 6 yrs manifested a marked pulmonary transparency; 87% manifested bilateral accentuated hilar images. The same workers also manifested a swollen pharyngeal mucous membrane and similar symptoms on the endonasal mucous membrane; 37% workers complained of tiredness, asthenia, vertigo, and sleeplessness. All these workers developed a tolerance to S02 and were able to withstand S02 concentrations which in unaccustomed individuals would have led to fatal intoxications considering that a concentration of 120 mg/cu m air cannot be tolerated for more than 3 min without the appearance of acute pathological symptoms.

19948 APTIC NO. 38397

Utidjian, Michael D., Paul Gross, and Robert T. P. deTreville

FERRUGINOUS BODIES IN HUMAN LUNGS. *Arch. Environ. Health., vol. 17:327-333, Sept. 1968. 12 refs.*

The prevalence of ferruginous bodies in the lungs of city dwellers at autopsy was investigated. Ferruginous bodies with a transparent central core or no visible central filament were present in 97 of 100 autopsies, i.e., in 55 of the 56 male victims and 42 of the 44 women. The age range was 37-87 for men and 24-90 for women. Of the patients in this series, 32 had some form of malignant disease, but there was no apparent association between the malignancies and the relative abundance of ferruginous bodies. There were two cases of primary lung cancer in men, but no mesotheliomas or asbestosis. The epidemiological significance of these results is not yet established, but pulmonary fibrosis or neoplasm is rarely associated with the presence of ferruginous bodies in the lungs of these autopsied city dwellers not occupationally exposed to asbestos. (Author abstract modified)

19949 APTIC NO. 37710

Villiers, A. J. de, J. P. Windish, F. de N. Brent, B. Hollywood, C. Walsh, J. W. Fisher, and W. D. Parsons

MORTALITY EXPERIENCE OF THE COMMUNTY AND OF THE FLUORSPAR MINING EMPLOYEES AT ST. LAWRENCE, NEWFOUNDLAND. *Occupational Health Rev. (Ottawa), 22(1/2):1-15, 1971. 6 refs.*

The unusual incidence of lung cancer among the miners of St. Lawrence, Newfoundland spurred epidemiological investigations which revealed a radiation hazard in the fluorspar mines located in the area. Environmental surveys for determinations of dust and radiation concentrations were conducted as well as epidemiological studies of community and occupational mortality. Although free silica content was high in certain instances, the general degree of dustiness at the time of the survey was not alarming. Average dust concentrations were above the threshold limit value at seve underground and tw surface locations. Average fluoride concentrations were well below the limit at each of the localities sampled. High relative concentrations of radon and radon daughters were determined in the working places. The environmental survey data and results of epidemiological studies are tabulated. Exposure to radon was pinpointed as the most important site-potentiating and cancer-inducing factor.

19950 APTIC NO. 38708

Vogel, James A., Malcolm A. Gleser, Robert C. Wheeler, and Bertwell K. Whitten

CARBON MONOXIDE AND PHYSICAL WORK CAPACITY. *Arch. Environ. Health, vol. 24:198-203, March 1972. 18 refs.*

Submaximal and maximal exercise capacity were compared in 16 subjects while breathing air and a 225-ppm carbon monoxide-air mixture, the latter resulting in a carboxyhemoglobin level of 20%. Maximal oxygen uptake decreased approximately proportional to the reduction in arterial oxygen content (24%) and irrespective of the arterial oxygen tension. The incremental increases of heart rate and ventilation with exercise were greater in the subjects when breathing CO than air, but peak ventilation was reduced with CO. Except for the latter, these responses were similar to those with hypobaric hypoxia. (Author abstract)

19951 APTIC NO. 38390

Wagner, J. C., C. A. Sleggs, and Paul Marchand

DIFFUSE PLEURAL MESOTHELIOMA AND ASBESTOS EXPOSURE IN THE NORTH WESTERN CAPE PROVINCE. *Brit. J. Ind. Med. (London), vol. 17:260-271, 1960. 34 refs.*

The correlation between diffuse pleural mesothelioma and asbestos exposure in the northwestern Cape Province of South Africa was investigated. Thirtythree cases of the disease were examined; all but one had a record of probable exposure to crocidolite asbestos. In the majority of cases, the exposure was in the Asbestos Hills to the west of Kimberley. Past occupations, places of residence, and complete case histories were considered. Eight case histories are presented to illustrate various aspects of the disease and the different types of exposure to asbestos dust.

19952 APTIC NO. 38396

Wagner, J. C.

ASBESTOSIS IN EXPERIMENTAL ANIMALS. *Brit. J. Ind. Med. (London), vol. 20:1-12, 1963. 12 refs.*

The effects of mill dusts from three types of asbestos, i.e., chrysotile, amosite, and crocidolite, on guinea pigs, monkeys, and rabbits were assessed on histological criteria. The chrysotile and amosite samples were relatively pure, but the crocidolite dust consisted mainly of ironstone and silica with less than 10% asbestos fiber. In all three species of animals, the amosite dust produced more marked lesions and at an earlier period than the chrysotile dust. Exposure to crocidolite dust resulted in severe lesions in guinea pigs and monkeys, and the animals in the groups exposed to crocidolite succumbed more readily to respiratory infections. Asbestos bodies were scanty and usually segmented in the animals exposed to chrysotile, with only occasional fibers observed. In the animals dusted with amosite, the asbestos bodies were plentiful, rarely segmented, and the fiber content was considerable. (Author abstract modified)

19953 APTIC NO. 38389

Webster, Ian

ASBESTOS EXPOSURE IN SOUTH AFRICA. *Pneumoconiosis, Proc. Int. Conf., 3rd, Johannesburg, South Africa, 1969, p. 116-118. 2 refs. (April 24 - May 2.)*

Asbestos exposure in South Africa can occur in factories and mines or from atmospheric pollution around these. South Africa is unique in that crocidolite, amosite, and chrysotile are mined and processed in the country. The distribution of mesothelioma of the pleura was computed and correlated with data on the race, sex, age, and location of the victims. The part played by asbestos in the development of mesothelioma may be indirect and may well cause the direct carcinogen to be retained in contact with the lower respiratory tract for a longer period than when the carcinogen is inhaled by itself. The direct carcinogen may not be a single subject and the cases from the northern cape of South Africa suggest that another mineral may be involved. Asbestosis, tuberculosis, and biopsy and autopsy findings are discussed.

19954 APTIC NO. 37782

Wexler, Berta

ASPECTS OF AIR POLLUTION AROUND THE WORKING PLANTS. *(Aspecte ale poluarii atmosferei in perimetrul peruzinal). Text in Rumanian. Rev. Chim. (Bucharest), 22(11):690-691, Nov. 1971. 11 refs.*

Gaseous air pollutants may induce a wide range of respiratory diseases according to their chemical structure. Long-lasting exposure of populations dwelling in industrial areas to pollutants may lead to acute bronchopneumonia, chronic respiratory deficiency, and asthma. Populations living close to organic chemical and food processing plants with enzyme involvement are subject to bronchial spasms. Acute asthmal attacks are especially frequent in sulfur dioxide-polluted areas. Long-lasting inhalation of small amounts of air pollutants may lead to progressive sclerosis of the alveolar walls developing into atropic emphysema. But the increasing danger of air pollution is constituted by the presence of carcinogenic hydrocarbons in the atmosphere. Reference is made to the high incidence in primary bronchopulmonary cancer characteristic of modern times. Rickets incidence in children dwelling in industrial areas is attributed to the blocking of vitamin D synthesis in their body because of UV radiation deficiency; this latter occurs due to the UV screening action of the air pollutants. Polymer fever is a new disease referred to and occurring in areas located around teflon producing plants. The need for a regular check-up and for improved control equipment within the emission sources is emphasized.

19955 APTIC NO. 37921

Woitowitz, H. J.

THE IMPORTANCE OF ASBESTOS FOR OCCUPATIONAL MEDICINE AND ECOLOGY. *(Die Bedeutung des Asbests fuer die Arbeitsmedizin und Oekologie). Text in German. Deut. Med. Wochenschr., 97(9):346-351, March 1972. 49 refs.*

Asbestos poses not only a danger to workers getting in direct contact with the material, but also the entire population. Extreme opinions maintain that there is no person in the civilized world today who has not been exposed to asbestos. Asbestos plants contribute to the general atmospheric pollution by asbestos dust and also by the erosions of the break-linings of millions of automobiles (the latter has not yet been confirmed experimentally). A study in 1963 revealed that at routine autopsies every fifth to second adult had asbestos bodies in the lungs, irrelevant of the occupation he held. Most recent studies have shown that the so-called asbestos bodies in lungs are really due to asbestos dust.

19956 APTIC NO. 38452

Wyszynska, Halina

BENZO(A)PYRENE IN MAN S ENVIRONMENT AND ORGANISM. *(Benzo(a)piren w srodowisku i w organizmie czlowieka). Text in Polish. Gaz, Woda Tech. Sanit. (Warsaw), 46(1):2-4, Feb. 1972. 28 refs.*

Environmental pollution with polynuclear hydrocarbons in terms of origin and accumulatin in plant and animal organisms is reviewed. Main emphasis is given to benzo(a)pyrene which appears in the air as a result of fuel pyrolysis from industrial, domestic, and traffic sources. Its levels may reach several nannograms per cu m of air, depending on the distance from the emission source. Biosynthesis of benzo(a)pyrene in plants is another source of polynuclear hydrocarbons. While benzo(a)pyrene promotes plant growth and is considered a plant growth hormone, its carcinogenicity in man and experimental animals has been confirmed. The daily intake of carcinogenic hydrocarbons by man (from air dust, food, and drinking water) constitutes an average of 10 micrograms.

19957 APTIC NO. 37801

Yanysheva, N. Ya.

MEDICAL APPROACHES TO THE STANDARDIZATION OF CANCEROGENIC SUBSTANCES IN THE ATMOSPHERE. *(O metodicheskikh nodkhodakh k normirovaniyu kantserogennykh veshchestv v atmosfernom vozdukhe). Text in Russian. Gigiena i Sanit., 37(1):90-93, 1972. 26 refs.*

Problems of the standardization of carcinogenic substances in the atmosphere are discussed. The existence of a relationship between the measure of carcinogenic doses and both latency time and tumor frequency allows the establishment of maximum allowable concentrations. The determination of threshold values is of particular importance. Due to the lack of specific indicators for the initial stages of cancer development, the determination of dose-effect relations is difficult. Such relations were modeled on skin cancer due to benzopyrene. Skin cancer cannot be regarded as a limiting indicator in standardization, as different organs and tissues showed different sensitivities. A lung cancer model was elaborated on animals with intratracheal treatment. Various factors supporting the carcinogenic effect of different doses were revealed (non-carcinogenic pollutants reducing the resistance of the bronchial epithelium, chemical substances facilitating the solution of carcinogenic substances, adsorbers and tissue or cell lesions facilitating the deposition). Benzopyrene deposition and elimination processes in lung were studied. The role of the metabolism is not clarified sufficiently. Dose-effect studies were carried out by the author for benzopyrene and dibenz(ah)anthracene, using mathematical methods. Even small doses were found to be hazardous. To determine the maximum allowable concentrations, comprehensive animal tests as well as probability calculus and statistical methods are required.

19958 APTIC NO. 37890

Yoshida, Katsumi and Masayoshi Katabatake

POISONING EXPERIMENT BY INHALATION OF CONTAMINATED SUBSTANCE INHALATION TEST OF SO3 MIST. (LONG TERM EXPOSURE OF SULFURIC ACID MIST AGAINST GUINEA PIGS). *(Osen bussitsu kyunyu ni yoru chudoku jikken SO3 misuto kyunyu jikken. (Morumotto ni taisuru ryusanmisuto no choki bakuro jikken)). Text in Japanese. In: A Study of the Administration Method of Medical Care for Sufferers from Public Nuisance in Yokkaichi City. Mie Prefectural Health and Medical Study Group (Japan), p. 27-30, March 1971.*

Guinea pigs were divided into four groups: one for a control group, one for inhalation of sulfur trioxide mist, one for inhalation of albumin, and one for inhalation of albumin after inhaling S03 mist. A long term repeated exposure test within the limits of 8.5 mg/cu m on the average, a minium of 3.2 mg/cu m, and a maximum of 22.1 mg/cu m in concentration was conducted twice a week. As the result, it became clear that inhalation of SO3 causes breathing difficulty with the contraction of the air tract, though this depends upon the individual difference of each animal. Since the state of the breathing difficulty very well resembles that which appears in the group with inhalation of albumin, the peripheral eosinophiles number and the amount of histamine in the lung were examined for an allergological test, and both of them showed some increase. It also became evident that the air tract infection occurs by inhalation of SO3, and aggravation of this causes the symptom of breathing difficulty.

19959 APTIC NO. 38580

Yoshikawa, Hiroshi

METALS AND LIVING BODY. *(Kinzoku to seitai). Text in Japanese. Kogai Taisaku to Gyosei (Environ. Pollut. Countermeasure and Adm.), 3(7):4-26, July, 1971.*

A review of the metal content in the normal human body and the environmental pollution by various metals are presented. Lead and cadmium are discussed as main sources of metal pollution, and other causes of occupational hazards such as mercury, arsenic, nickel, chromium, manganese, beryllium, cobalt, tin, vanadium, and zinc are reviewed briefly. The toxic reactions and maximum permissible concentrations of various metal compounds are presented in a table. The atmosphere of Tokyo contains 1-5 micrograms of lead as compared to 1-2.5 micrograms in average American cities. The cadmium content in the air of Japanese cities runs from 0.01-1 micrograms/cu m, approximately the same as that of England. Cadmium is heavily contained in cigarettes. According to a published material, a normal person s daily intake of cadmium through the air is 0.24 micrograms, 12 micrograms/from 20 cigarettes, 80 micrograms through food, and 2 micrograms through water. But the absorption rates through the air and cigarettes are 30% respectively, whereas only 5% of intake through food and water are absorbed. According to this calculation, the total daily intake of cadmium by a normal person is 7.78 micrograms. A significant correlation exists between the cadmium concentration in the air and the hardening of arteries and all the heart diseases except for those caused by high blood pressure and rheumatism.

19960 APTIC NO. 37894

Youji, Tateishi, Shoichi Kobori, Masaya Yamashita, Tadashi Mori, Kan Sakakura, Taichi Kodama, and Hideo Makino

STUDIES ON INFLUENCES OF AIR POLLUTION TO SCHOOLCHILDREN IN YOKKAICHI AREA. *(Yokkaichi chiku ni okeru taikiosen no gakudo ni oyobosu eikyo chosa). Text in Japanese. In: A Study of the Administration Method of Medical Care for Sufferers from Public Nuisance in Yokkaichi City. Mie Prefectural Public Nuisance Health and Medical Study Council (Japan), p. 87-112, March 1971.*

Medical examinations including physical measurements, frequency of absence from class, investigation by questionnaire about subjective symptoms, chest X-rays, and ophthalmological and otorhinolaryngological examinations were performed on the schoolchildren in (I). a polluted area, (II). a newly air polluted area, and (III). a non-polluted area. The height of schoolchildren in III was taller than in I and II. The frequency of absence from class in I became high during the period of April to July, when the smog was frequently produced. Concerning with subjective symptoms, epistaxis, nausea, cough, and eye pain are becoming of great concern in II. There were no significant differences in the pulmonary function test. The maximum expiratory flow rate increased remarkably on both sexes of schoolchildren in II and III. There was no significant differences in chest X-ray findings. Although no significant differences were seen in opthalmological examinations, complaints of eye pain were frequent in I and II. On rhinolaryngological examinations, the incidence of epistaxis and sore throat was frequent in both I and II.

EFFECTS-PLANTS AND LIVESTOCK

19961 APTIC NO. 38687

Barnes, Robert L.

EFFECTS OF CHRONIC EXPOSURE TO OZONE ON SOLUBLE SUGAR AND ASCORBIC ACID CONTENTS OF PINE SEEDLINGS. *Can. J. Botany, 50(1):215-219, Jan. 1972. 20 refs.*

Small seedlings of five pine species (Pinus strobus, echinata, elliottii, serotina, and taeda) were exposed to low levels of ozone for periods from 5 to 22 weeks. Exposure to 5 pphm 03 resulted in significant increases in total soluble carbohydrates, reducing sugars, and ascorbic acid. In seedlings exposed to 15 pphm 03, soluble sugars were higher than in the controls but ascorbic acid levels were not. Reasons for the increases in soluble sugars and higher ascorbate levels are cited. (Author abstract modified)

19962 APTIC NO. 37912

Chisnall, K. T. and J. Markland

THE CONTAMINATION OF PASTURE LAND BY LEAD. *J. Ass. Pub. Anal., vol. 9:116-118, Dec. 1971. 3 refs. (Presented at the Association of Public Analysts, Annual Conference, Matlock, England, May 13-15, 1971.)*

Following the death of several cattle and two ponies on a farm adjacent to waste heaps from old lead mine workings and near a lead smelter, grass samples from a number of fields were analyzed for lead. The amount of lead (80-520 ppm) in grass from 11 fields was high enough to support the diagnosis of lead poisoning. The presence of antimony in the grass in a high ratio relative to lead suggested that the contamination originated in the lead mine waste, and not in smelter fumes.

19963 APTIC NO. 38332

Daessler H. -G. and S. Boertitz

EFFECTS OF AIR POLLUTANTS ON AGRICULTURAL PRODUCTS. *(Zur Wirkungsweise von Luftverunreinigungen auf landwirtschaftliche Erzeugnisse). Text in German. Biol. Zentralbl., 90(5):611-619, Sept./Oct. 1971. 12 refs.*

With the aid of simplified graphs, the specific effects of sulfur dioxide fluorides, and indifferent and toxic (lead, zinc, and arsenic containing) dusts on agricultural plants in the German Democratic Republic are shown. Continuous and long-term exposure to low S02 concentrations impair the photosynthesis (carbon dioxide assimilation), which in turn affects the quantity and quality of plant products. Most characteristic is the reduction of crop yield. Moreover, the S02 intake raises the sulfate level in plants. Relatively high S02 concentrations cause the death of cells, photosynthesis does not take place any more in necrotic tissue. Exposure to fluorine-containing emissions and to dusts leads to an accumulation of these pollutants in the plants to an extent which might be harmful to animals. Exposure of plants to non-toxic dusts such as fly ash and soot causes considerable changes of the plant metabolism. Toxic dusts inactivate ferments and retard root growth.

19964 APTIC NO. 38411

Davidsson, Ingolfur

INCREASED FLUORINE POLLUTION. *(Vaxandi fluormengun). Text in Icelandic. Freyr, 67(7/8):167-168, April 1971.*

General problems of air pollution are outlined with special regard to fluorine. Damage caused by fluorine was observed in coniferous forests near Ragnars Peturssonar during the second part of the vegetation period. Red to brown spots appeared on the needles in August. In November, whitening of the needle edges was observed, which was followed by necrosis. Fluorine concentrations up to 193 ppm were measured in this area. Coniferous forests were damaged by fluorine-bearing dusts in concentrations of 10-20 ppm in Norway.

19965 APTIC NO. 38041

Davis, Donald D. and Francis A. Wood

THE RELATIVE SUSCEPTIBILITY OF EIGHTEEN CONIFEROUS SPECIES TO OZONE. *Phytopathology, 62(1):14-19, Jan. 1972. 15 refs.*

Eighteen species of 2- to 6-year-old coniferous tree seedlings were exposed to 10 pphm ozone for 8 hrs or to 25 pphm 03 for 4-8 hrs. Virginia pine, jack pine, European larch, Austrian pine, Scotch pine, eastern white pine, eastern hemlock, Japanese larch, and pitch pine were susceptible. Arborvitae, balsam fir, Douglas fir, white fir, red pine, Black Hills spruce, Colorado blue spruce Norway spruce, and white spruce were resistant to the highest dose. The incidence of sensitive plants within susceptible species populations ranged from 6-69%. Variable symptom response was observed in different species, among individual plants of the same species, and among different branches and needles of the same plant. Chlorotic mottle and tip necrosis or complete needle necrosis were the most commonly observed symptoms. Susceptible species were sensitive from the 4th through the 13th week after budbreak. Seedlings in the dormant condition were resistant. (Author abstract)

19966 APTIC NO. 38218

Dobrzanski, Bohdan, Jan Glinski, and Modest Misztal

EFFECT OF CEMENT PLANT DUSTS ON SOME PROPERTIES OF SOIL. *(Wplyw pylow z cementowni na niektore wlasciwosci gleb). Text in Polish. Rocz. Glebozn., 21(2):409-420, 1970. 11 refs.*

Humus content, pH, calcium carbonate, total vanadium, copper, manganese, strontium, chromium, and nickel were determined in soil samples taken 0-10 and 10-20 cm from a cement plant. The highest CaCO3 content (over 4%) was found within 200 m of the plant. The presence of cement dust resulted in an increase in soil particle aggregation. No distinct correlation was observed between soil pH and CaCO3 content. The microconcentration of elements was a function of both the concentration of cement dust and soil properties. Strontium and Mn were particularly sensitive indices of dust content.

19967 APTIC NO. 38574

Dybczynska, Krystyna

POLAND S FORESTS HIT BY AIR POLLUTION. *(Luftfororening hot mot polska skogar). Text in Swedish. Tek. Tidskr., 101(20):30-31, Dec. 1971.*

Gaseous emissions amount to about three million tons yearly in Poland, with sulfur dioxide predominant. Precipitation adds 100 kg of sulfuric acid to one ha yearly. Dust is emitted in an amount of five million tons/yr. Forests near industrial areas are attacked by sulfur dioxide and nitrogen gases. One half of all trees are more or less seriously damaged in a total forest area of 300,000 ha which accounts for 3.5% of the total forest area. Thermal power plants consuming coals with 0.5-4% sulfur represent a major danger. Chemical plants, emitting primarily sulfur dioxide, pollute the air in a radius of 15 km; 500 ha of forest was destroyed, 700 ha damaged, and 4000 more ha affected by a chemical plant producing nitrogen-containing fertilizer, for example. The metallurgic industry is the source of 7% of the total SO2 emission, and dust and metal fluorides emissions are not negligible. While there are no resources available, a law for the protection of the atmosphere was inacted in 1966. In the period from 1971 to 1975 an increase of investments for pollution control by 150% is planned.

19968 *APTIC NO. 37923*

Grill, Dieter

BUFFER CAPACITY OF HEALTHY AND SMOKE INJURED SPRUCE NEEDLES. (Pufferkapazitaet gesunder und rauchgeschaedigter Fichtennadeln). Text in German. Pflanzenkrankheit., 78(10):612-622, Oct. 1971. 22 refs.

Needles from spruces in emission-free and sulfur dioxide polluted areas were collected. Soon after removal of the needles from the branches, the pH value was determined with a single bar electrode. Buffer capacity showed a fluctuation during the year: one maximum in May and a second in July. Buffer capacity diminished as needles grew older. Needles fumigated with sulfur dioxide were usually less buffered than nondamaged ones. Trees growing in the city had less buffer capacity compared with controls. Resistant trees had a higher buffer capacity. Buffer capacity and the amount of organic acids altered in the same way. The change in buffer capacity was produced mainly by carboxyl (COOH) groups of organic acids, phenolic hydroxides, and amphoteric electrolytes. Alteration of the buffer capacity could not be comprehended as neutralization, because buffering against hydrogen and hydroxide ions changed equally. Sulfur dioxide resistance were determined by cell-physiological methods during one year, and variation of the resistance with the age of needles agreed well with the alteration of buffer capacity.

19969 APTIC NO. 38017

Guderian, R., H. van Haut, and H. Stratmann

PLANT-DAMAGING HYDROGEN FLUORIDE CONCENTRATIONS. *(Pflanzenschaedigende Fluorwasserstoff-Konzentrationen). Text in German. Umschau (Berlin), 71(21):777, 1971. 2 refs.*

Because of increased emissions of fluorine-containing gases from plants manufacturing aluminum, copper, superphosphate, glass, or cement, tests were conducted to determine the effect of various concentrations of atmospheric hydrogen fluoride on a variety of plants. Varying harmful effects were noted with concentrations of 0.85-4.2 micrograms/cu m in air, but no definite conclusions regarding allowable concentration limits were reached.

19970 APTIC NO. 38293

Hirano, Hideo, Iyomaro Hanasawa, Touru Shigeta, Mitsuo Yano, Ichiro Fujinuma, and Bunsaku Wakai

STUDY ON PREVENTIVE MEASURES AGAINST AIR POLLUTION, 1. STUDY ON PURIFICATION ABILITY OF SOIL AGAINST GAS. *(Taikiosen boshi taisaku ni kansuru kenkyu dai 1 ho. Dojo no gasu joka no ni kansuru kenkyu). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan J. Public Health), 18(10):442, 1971.*

Concrete which covers the ground completely stops the purification abilities of soil, such as dissolution, absorption, or softening of harmful substances including those which cause air pollution. Surface soil of volcanic ashes and subsoil consisting of 5 kg (ratio of contained water, 6.2-7%) was put into a 20 l water tank and tightly sealed. Another sample was also tightl ealed in the same way after sterilization by heating for 30 min at 200 C and supplementing the evaporated water. Then carbon monoxide, nitrogen dioxide, sulfur dioxide, and acrolein was introduced and the gas in the air was estimated. Carbon monoxide showed distinct difference when compared with the control; acrolein decreased as the time passed but, compared with the control, the absorption in the beginning period was great.

19971 APTIC NO. 38412

Horntvedt, Richard

EFFECTS OF AIR POLLUTION ON FORESTS. *(Virkninger av luftforurensninger pa skog). Text in Norwegian. Norsk Skogbruk, 17(1):3-4, 1971.*

Direct and indirect effects of air pollution and related investigations for a glass-fiber plant are described. Direct damage caused by gaseous and particulate pollutants has a local character. Damage to forests was observed around a glass-fiber processing plant emitting fluorine and sulfur dioxide in amounts of 3 kg and 20 kg/hr, respectively. Knowledge of meteorological data such as wind speed, stability, and stack height, and emission volume allow correct forecast of concentrations at different distances. The respective thresholds applied for HF and SO2 were 1 microgram/cu m and 0.5 micrograms/cu m. With neutral stability, HF concentrations exceeding the above threshold could be anticipated at a distance of 5 km in wind direction. Synergetic effects of HF and SO2, and a minimum exposure time of 10 days were considered. The proliferation of insects and the reduced resistance to drought and frost are some of the indirect effects of air pollution. Increasing soil acidification due to SO2 is also a general phenomenon. A pH value of 4.7 was measured in 1967 against pH of 5.3 in 1957. The increase in acidity was calculated as 1.5 %/yr.

19972 APTIC NO. 38121

Houston, Daniel Brown

PHYSIOLOGICAL AND GENETIC RESPONSE OF PINUS STROBUS L. CLONES TO SULFUR DIOXIDE AND OZONE EXPOSURES. *Wisconsin Univ., Madison, Thesis (Ph.D.), Ann Arbor, Mich., Univ. Microfilms, Inc. 1971, 87p. 100 refs.*

The effects of ozone and sulfur dioxide on eastern white pine (Pinus strobus L.) were studied by fumigating clones from 47 sensitive and 47 tolerant trees during two growing seasons. Exposure of 35 sensitive and 35 tolerant clones to 20 ppm ozone in the first year of the study produced no visible damage on current needles. Studies conducted the following year indicated that SO2 was the most important factor in the initiation of symptoms characteristic of those noted in the field. All sensitive clones developed symptoms at five pphm SO2, and all clones, sensitive and tolerant, were damaged at 45 pphm. Concentrations of 2.5 pphm SO2 plus five pphm 03 injured current needles on sensitive clones, suggesting a synergistic reaction mechanism for the two fumigants. Ozone trials produced no definite pattern of injury with respect to tolerant and sensitive classes. Repeatability analyses for needle elongation demonstrated that field selection for tolerance and sensitivity can be accomplished with a high degree of success. Biochemical evaluations of phenolic compounds and enzyme systems failed to indicate well defined differences between sensitive and tolerant trees.

19973 APTIC NO. 38014

Hutchinson, G. L., R. J. Millington, and D. B. Peters

ATMOSPHERIC AMMONIA: ABSORPTION BY PLANT LEAVES. *Science, 175(4023):771-772, Feb. 18, 1972. 7 refs.*

Ammonia absorption rates for four crop species were measured by monitoring the disappearance of NH3 from an airstream flowing through a small growth chamber containing a single plant seedling. The rates were relatively constant during the day but dropped sharply at night. Daytime absorption rates for sunflower, corn, and cotton plants growing in soil containing 5 mg nitrogen were 4.9, 5.6, and 3.5 micrograms sq dm/hr, respectively. For soybeans growing in soil containing 0, 5, and 20 mg nitrogen, the rates were 4.1, 4.2, and 4.0 micrograms/sq dm/hr, respectively. The differences in absorption rates among species may be due to differences in internal leaf geometry, which in turn determines the resistance to diffusive transport of NH3 across the air space inside leaves. The demonstrated capacity of all plants to absorb NH3 suggests an important role for plants in the decontamination of the atmosphere.

19974 APTIC NO. 38576

Kaemmerer, Kurt, Eckhard Barke, and Michael-Juergen Seidler

TOLERANCE OF SHEEP TO HIGH CONCENTRATIONS OF SULPHITE IN DRY PULP. *(Vertraeglichkeit von Sulfit in hoher Konzentration auf Trockenschnitzeln bei Schafen). Text in German. Zucker, 25(4):128-134, Feb. 1972. 8 refs.*

The sulfite on dry pulp is not a natural substance of dry pulp but it is a contamination product which stems from the drying process in dependence of the type of fuel used. The different types of fuels have different sulfur concentrations which lead to different sulfur dioxide concentrations on dry pulp. An average residual concentration of about 1000 mg SO2/kg dry pulp must be taken into account. Dry pulp is mostly used as fodder for ruminants in average quantities of 2.5 kg for cattle, 0.3 to 0.5 kg for sheep, and 0.3 kg for pigs. During a 90-day tolerance test with male sheep fed dry pulp containing 1% SO2, it was found that sodium disulfite was tolerable without any signs of damage to health. Weight increase was unimpaired with 500 g hay, 500 g dry pulp, and 200 g oatmeal. Introduction of dried pulp with sulfite reduced fodder uptake only in the first days of the test. Blood chemistry, transaminases, serum albumin electrophoresis, urine status, rumen function, ammonia liberation, and fatty acid formation suffered no ill effect from SO2. Dissection findings and organ weights were insignificant, apart from random findings such as renal cysts. Therefore, SO2 in factory-dried pulp can be tolerated by ruminants without any adverse effects.

19975 APTIC NO. 38417

Largent, Edward J.

THE EFFECTS OF AIR-BORNE FLUORIDES ON LIVESTOCK. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 64 - 72. 12 refs. (May 3-5, Louis C. McCabe, ed.)*

Fluorides carried through the air and deposited on pastures and fields of forage pose a hazard of chronic fluorosis to livestock fed on these plants. Previous reports on the mechanism and symptoms of fluorosis occurring in livestock near factories are reviewed. An investigation is described in which cattle kept on a farm in the vicinity of a rock phosphate plant developed clinical fluorosis. The results of measurements of fluoride concentrations in the atmosphere over the farm, in samples of vegetation grown on the farm, and in the tissues of the exposed cattle are given. Fluoride levels in both air and vegetation decreased as the distance from the factory increased. Concentrations of fluoride in the bones of affected animals were abnormally high.

19976 APTIC NO. 37916

Lorbacher, H., H. -D Puels, and H. -W. Schlipkoeter

STUDIES ON THE STORAGE AND METABOLISM OF 3,4-BENZPYRENE (BENZ)-(A)-PYRENE IN MICROORGANISMS. *(Untersuchungen ueber Speicherung und Metabolismus von 3,4-Benzpyren (Benzo(a)pyren) in Mikroorganismen). Text in German. Zentralbl. Bakteriol., Parasitenk. Infektionskr. Hyg.: Abt. 1: Orig., Reihe B, vol. 155:168-174, 1971. 25 refs.*

The uptake and metabolism of 3,4-benzopyrene by six strains of Ps. aeruginosa, isolated from oil-saturated soil, and a strain of E. coli were investigated. The microorganisms were first adapted to 3,4-benzopyrene and also grown in a medium containing the compound for 3 or 5 days. The adaption was controlled with the aid of bacterial growth and cellular protein. For the investigations, a nutritive medium containing 3,4-benzopyrene was inoculated from the centrifugate of the adapted bacteria and then cultured for 4 or 5 days at 37 or 26 C, respectively. The number of germs, amount of protein, and amount of 3,4-benzopyrene were measured before and after the investigations. The addition of 3,4-benzopyrene caused a large increase in bacterial growth. Microorganisms grown in the benzopyrene-enriched medium had 3-15 times the usual amount of protein. For the 3,4-benzopyrene measurements, the samples were centrifuged and, after decanting, the supernatant and sediment were shaken with nonfluorescent benzene. The benzopyrene was determined by fluorescence spectrophotometry. No benzopyrene was found in the supernatant, although it was present in the supernant of controls without bacteria. The sedimented bacteria contained up to 89% 3,4-benzopyrene. The original benzopyrene concentration decreased by 10-26%.

19977 APTIC NO. 38404

MacIntire, Walter H.

AIR VERSUS SOIL AS CHANNELS FOR FLUORIC CONTAMINATION OF VEGETATION IN TWO TENNESSEE LOCALES. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 53 - 58. 2 refs. (May 3-5, Louis C. McCabe, ed.)*

Long-term (20-year) field and experimental studies are reported of the processes through which forage vegetation may acquire an abnormal fluorine content; the work was initiated in response to complaints that fluorine emissions from nearby industry were causing damage to plants and livestock. Results indicate that soils possess distinctive capacities to fix additive fluorides against rain-water leaching and against migration of the fluorine ion into above-ground forage crops, and that such migration is repressed in soil systems that contain adequate supplies of calcium. Abnormal fluorine content in the vegetation of certain locales in Blount County (eastern Tenn.) is attributed to direct contamination from the hydrofluoric acid that is emitted to the atmosphere through the manufacture of aluminum. In the absence of fluoric dusts and without mechanical pollution from phosphatic soils, fluoric contamination of forage vegetation in Maury County (middle Tenn.) apparently comes directly from the fluoric effluents present in that atmosphere, rather than through uptake of florides from the soil. (Author summary modified)

19978 APTIC NO. 37926

Markland, J. and J. Vallance

INVESTIGATION OF THE UPTAKE OF LEAD BY VEGETABLES FROM COMPOSTS CONTAINING LEAD. *J. Ass. Pub. Anal., vol. 9:119-121, Dec. 1971. 5 refs. (Presented at the Association of Public Analysts, Annual Conference, Matlock, England, May 13-15, 1971.)*

Areas of Derbyshire near the sites of former lead mining operations have lead in the soil. The lead present in plants grown in the area could have been derived from air pollution or from the soil. An investigation was undertaken to determine the amount of lead in vegetables grown in soil with controlled lead content. John Innes No. 3 compost without calcium carbonate was used as an acid soil and the same compost with calcium carbonate as a neutral soil. The composts contained 50 parts of lead/million. Each compost was divided into four lots and the lots were dosed with lead carbonate to give added lead contents of 0, 250, 500, and 1000 ppm. Carrots, peas, French beans, lettuce, cabbage, and brussels were grown in these composts, out of doors. Samples were digested by the nitric acid/sulfuric acid process, followed by dithizone extraction, and colorimetric or polarographic estimation of lead. There was only a little evidence of lead uptake for peas and no evidence of lead content increasing with the lead content of the compost. The lead on the French beans increased with the lead content of the compost. Soil contamination by air pollution occurred with the carrots, lettuce, and the brassica samples.

19979 APTIC NO. 38419

Massey, L. M.

SIMILARITIES BETWEEN DISEASE SYMPTOMS AND CHEMICALLY INDUCED INJURY TO PLANTS. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 48 - 52. 13 refs. (May 3-5, Louis C. McCabe, ed.)*

Plant effects induced by sulfur dioxide and hydrogen fluoride are used to illustrate the difficulties in diagnosing cases of suspected injury from phytotoxic gases. Disease (i.e., injury) caused by such chemicals is a continuing process paralleling disease caused by living organisms, with chemical analysis of plant tissue used instead of microscopic examination and culture of the living organism to identify and confirm the diagnosis. Despite extensive knowledge of the characteristic symptoms produced by SO2, field diagnosis is often complicated by the wide variety of markings caused by such factors as drought, frost, winter injury, insects, disease, and various physiologic disorders. Thus, some knowledge of the conditions of exposure, weather factors, and the reaction of susceptible indicator plants is necessary. Sulfur dioxide and hydrogen fluoride produce symptoms that are similar in certain respects and difficult to distinguish. Problems in using color values, tip burn, and foliage injury to conifers as diagnostic symptoms are discussed.

19980 APTIC NO. 37794

Mooney, H. A., E. L. Dunn, A. T. Harrison, P. A. Morrow, B. Bartholomew, and R. L. Hays

A MOBILE LABORATORY FOR GAS EXCHANGE MEASUREMENTS. *Photosynthetica, 5(2):128-132, 1971.*

A mobile laboratory designed for the field measurement of the gas exhange of plants is described. A lightweight cuvette is utilized as the sampling device to monitor photosynthesis, respiration, and transpiration of diverse plant types growing in natural environments. Air temperature and humidity within the cuvette can be controlled through a wide range of values. Cuvette air temperature and dew point can be held either at constant set points or they can automatically track ambient conditions. Further, they can be changed between predetermined set-points by a programmer. The cuvette is connected with the laboratory control and monitoring devices with flexible, packaged lines which permit fast assembly of the total system. The mobile laboratory has been used successfully in condtions as extreme as Death Valley, California, during mid-summer. (Author abstract)

19981 APTIC NO. 38407

Phillips, Paul H.

FLUOROSIS IN LIVESTOCK. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 123 - 126. 1 ref. (May 3-5, Louis C. McCabe, ed.)*

Gaseous effluents from industrial activities may be important contributors to chronic fluorine poisoning in livestock. The three principal syptomatologic features are described in the order in which they occur: effects on the dental structures, the skeletal system, and the protoplasmic mass. Experimental feeding of raw rock phosphate fluoride to cattle resulted in an intake of 2 mg/day/kg body weight with safety; 4 mg was an unsafe level. Conversion of the results of these studies to the fluorine equivalent of the more soluble NaF would mean that 41-45 ppm NaF would not affect growth or milk and butter fat production; 75-87 ppm would affect milk production but not growth. A laboratory analysis of the fluorine level in the long bones of the legs provides an essential check in diagnosing fluorosis, since some of the symptoms are non-specific. The normal fluorine content in these bones is 200-1000 ppm, and no growth retardation or reduced yield of milk or butter fat occurs unless the average concentration exceeds 5000 ppm.

19982 APTIC NO. 37911

Porter, Lynn K., Frank G. Viets, Jr., and Gordon L. Hutchinson

AIR CONTAINING NITROGEN-15 AMMONIA: FOLIAR ABSORPTION BY CORN SEEDLINGS. *Science, 175(4023):759-761, Feb. 18, 1972. 9 refs.*

Thirty-day-old corn seedlings, grown in a greenhouse with different concentrations of supplemental nitrate nitrogen, were moved to a constant-temperature growth chamber and sealed in a 560-liter polyvinyl chloride tent. The plants were exposed to air containing ammonia labeled with nitrogen(15) (1, 10, and 20 ppm) for 24 hr and then harvested. The nitrogen(15) content of the tops and roots showed that at 1 ppm, 43% of the ammonia was absorbed, while at 10 and 20 ppm, 30% of the ammonia was absorbed. The results demonstrate that growing plants may be a natural sink for atmospheric ammonia.

19983 APTIC NO. 37977

Purves, David

CONSEQUENCES OF TRACE-ELEMENT CONTAMINATION OF SOILS. *(Environ. Pollut., 3(1):17-24, Jan. 1972. 14 refs.*

The chemical composition of the bulk of food has been profoundly modified by the intensification of the means of food production and as a result of the general contamination of the environment. Contamination of the soil in urban and industrial areas with potentially toxic trace elements, e.g., copper, boron, lead, and zinc, is largely irreversible. Sources of soil contamination, the trace-element content of plants grown on contaminated soils, and the effects on plant growth are considered. Contrasts and comparisons are drawn for soils in urban and rural areas. The composition of materials commonly used in gardens, e.g., soot, coal ash, municipal compost, and sewage sludge, are likely sources of trace element contamination. The primary source of contamination in urban parklands is atmospheric pollution. The boron, copper, lead, molybdenum, nickel, and zinc contents of cabbages grown in urban and rural areas were measured; the differences in mean levels for each element were highly significant.

19984 APTIC NO. 37792

Rao, D. N. and D. Pal

A VOLATILE FLUORIDE GENERATOR FOR FUMIGATING PLANTS. *Fluoride, 5(1):18-21, Jan. 1972. 5 refs.*

A simple apparatus for generating volatile fluoride in controlled amounts is described. A polyethylene reservoir is mounted over an atomizer and a feeder cup containing a solution of hydrofluoric or hydrofluorsilicic acid as a source of volatile fluoride. A syphon tube, fitted with a flow regulator, connects the reservoir to the feeder cup. The atomizer, consisting of a capillary tube, a compressed air nozzle, and a basal tube, converts the fluoride solution into a mist of fine droplets which pass into a heating tube and are converted to gas. Heavier droplets condense on the atomizer cover, and the resulting liquid is returned to the feeder cup. Due to the solution returning from the atomizer and the fresh solution coming from the reservoir, the level of liquid in the feeder cup remains more or less constant. This arrangement helps to maintain a constant concentration of the atomizing solution. The equipment is portable and can be used to fumigate plants at any location. It can be used to test plant damage from fluorides or absorption of fluoride under controlled conditions.

19985 APTIC NO. 38709

Temple, Patrick J.

DOSE-RESPONSE OF URBAN TREES TO SULFUR DIOXIDE. *(J. Air Pollution Control Assoc.), 22(4):271-274, April 1972. 12 refs. (Presented at the Air Pollution Control Association, Annual Meeting, 63rd, St. Louis, Mo., June 1970, Paper 70-145.)*

Four species of urban trees, i.e., gingko, Norway maple, pin oak, and Chinese elm, were fumigated with sulfur dioxide under controlled experimental conditions to determine the dose-response relationships. Resistance to SO2 increased in the order: Chinese elm, Norway maple, gingko, and pin oak. Elm showed almost 100% leaf necrosis at exposures over 2 ppm for 6 hr and severe chlorosis and necrosis at 0.25 ppm for 30 days. Fifty percent leaf necrosis occurred on Norway maple at 3 ppm for 6 hr and on gingko at 4 ppm for 6 hr; both species developed moderate marginal chlorosis at 0.50 ppm for 30 days. Injury on pin oak was minor, even at 8 ppm for 8 hr, but at 0.50 ppm for 30 days, a slight overall chlorosis developed on the leaves. The relative susceptibilities of the species were equal for long and short- term exposures. Duration of exposure and concentration of the pollutant were of equal importance in producing injury on Chinese elm and probably on pin oak; on Norway maple and gingko, concentration of SO2 was of greater importance than duration of exposure. (Author abstract modified)

19986 APTIC NO. 38420

Thomas, Moyer D., Russel H. Hendricks, and George R. Hill

SOME IMPURITIES IN THE AIR AND THEIR EFFECTS ON PLANTS. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 41 - 47. 10 refs. (May 3-5, Louis C. McCabe, ed.)*

Sulfur dioxide is usually given first consideration in studies of air pollution damage to vegetation since its effects are well known and because it is often present in greater amounts than other contaminants. Even when it is not directly implicated in cases of plant injury, its concentration may be a useful index to over-all contamination. The acute and chronic effects of SO2 are described, and the state of knowledge of effects of other pollutants is noted. Recent experimental studies relating to the long--held assumption that sulfuric acid aerosols are without effect on vegetation are discussed, and three types of foliar injury typical of smog injury to plants, as observed in the Los Angeles area, are considered: typical SO2 markings; smog gas markings (silver-leaf injury); and leaf spots, which occur only in fog.

19987 APTIC NO. 38568

Treshow, Michael

FLUORIDES AS AIR POLLUTANTS AFFECTING PLANTS. *Ann. Rev. Phytopathol., vol. 9:21-44, 1971. 91 refs.*

The pathological effects of fluorides on plants are reviewed with respect to fluoride sources, symptomatology, environmental influences, host-parasite relations, injury control, and air quality standards. The major sources of flouride emissions are producers of aluminum, ceramics, phosphate, and occasionally steel. Toxic concentrations of fluoride are largely airborne and absorbed by the leaves. Fluorides occur naturally in soils, but soil contamination may occasionally also provide an index of corresponding air contamination. Toxicity is influenced primarily by fluoride concentration, duration of exposure, and sequence and frequency of exposure, but may be modified by climate, e.g., temperature and humidity, soil factors, synergistic effects of other pollutants, and biological factors. Visible symptoms of fluoride damage, e.g., chlorosis, necrosis, and tip burn, metabolic and cytogenetic effects, and effects on growth and production are considered. The effects of fluorides on host-parasite interaction are also discussed. Fluoride injury controls include the application of protective chemicals, the development of resistant species, and basic elimination of the pollutant. For the highest degree of control, air quality standards are best based on the atmospheric fluoride concentrations capable of injuring the most sensitive plant species.

19988 APTIC NO. 38226

Turner, Neil C., Saul Rich, and Harley Tomlinson

STOMATAL CONDUCTANCE, FLECK INJURY, AND GROWTH OF TOBACCO CULTIVARS VARYING IN OZONE TOLERANCE. *Phytopathology, 62(1):63-67, Jan. 1972. 15 refs.*

Four tobacco cultivars that vary in ozone sensitivity were grown in the field and in two greenhouses, one with charcoal-filtered air and one with unfiltered air. The plants were compared for stomatal conductance, stomatal frequency, height, oven-dry weight, leaf area, and amount of fleck injury. The total leaf conductance, measured with a ventilated diffusion porometer, of the ozone sensitive cultivars was greater than that of the ozone-tolerant cultivars; both adazial and abaxial conductances were greater. However, the differences in stomatal conductance were not sufficient to account completely for the differences in fleck damage. In ozone-free air, the two ozone-sensitive cultivars grew more than did the two ozone-tolerant cultivars. The converse was true when the plants were grown in unfiltered air. The reduction of dry weight in the unfiltered air accompanied a reduction in the green leaf area caused by flecking and early senescence of damged leaves. (Author abstract)

19989 APTIC NO. 38413

Zieger, Erich

ACTUAL IMPLICATIONS OF INDUSTRIAL SMOKE DAMAGE TO FORESTS. *(Die heutige Bedeutung der Industrie-Rauchschaeden fuer den Wald). Text in German. Wiss. Z. Tech. Hochsch. Dresden, 4(3):499-505, 1954/1955. 12 refs. (Presented at the Academicus, Tharandt, East Germany, Nov. 19, 1954.)*

General problems of smoke-induced damages, diagnosis, and control methods are reviewed. Damages caused by etching of leaves and needles are mostly of an acute and local character. Damages due to disturbed assimilation, caused primarily by sulfur dioxide, are of the greatest importance economically. Sulfur dioxide is less harmful in winter and during night hours. Acids and sulfur dioxide both turn the soil acid, and affect the edaphon. Such damages are primarily of chronic character. Different diagnostic methods such as plant, soil, and air analyses should be combined to obtain reliable results. Due to the complexity of the processes involved in smoke damages, biological tests are best in diagnosis. The sunlight test exploits the fact that branches cut from smoke-damaged trees lose their needles more readily than such from intact trees. Haertel s turbidity test is based on the increased wax secretion by smoke-damaged needles. The appraisal of damages is made by evaluation of the economic losses after the limitation of the smoke-affected area. The possible control measures in forestry are the breeding of smoke-resistant species and liming, while the pollution control techniques presently available in industry are unsatisfactory, the major problems being caused by sulfur dioxide. Standardization of thresholds and maximum allowable concentrations, as well as cooperation of forestry and industries are imperative.

EFFECTS-MATERIALS

19990 APTIC NO. 37924

WASTE GASES THREATEN PRADO PAINTINGS. *(Abgase gefaehrden Prado-Kunstwerke). Text in German. VDI (Ver. Deut. Ingr.) Nachr. (Berlin), 26(2):32, Jan. 1972.*

With a spontaneous program, the Spanish government is trying to salvage the paintings in the Prado-palace in Madrid which are threatened by industrial waste gases and automobile exhaust gases. The palace is located at the end of the industrial section of Madrid, which to date has done nothing to control waste gas emission. The reasons for the high air pollution are the mostly coal-fired industrial plants and thousands of old diesel operated cabs. A system filtering out all air pollutants and controlling the temperature and relative humidity shall be installed in the palace within the next three months. The palace is the second largest are gallery of the world, after the Louvre in Paris.

19991 APTIC NO. 38253

DYNAMITE NOBEL: WASTE GAS STACK OF SPIRAL TUBES. *(Dynamit Nobel: Abgaskamin aus Spiralrohen). Text in German. Oel Gasfeuerung, 17(1):44-45, Jan. 1972.*

For dischargine extremely corrosive flue gases such as sulfuric acid and sulfur dioxide, 90 m high stack made of polyvinylchloride tubes was erected in a chemical plant in Antwerp. The material was selected because of its excellent chemical resistance. The flue gases pass the stack with a temperature of 60 C and condense on the inner wall of the stack to sulfuric acid of every concentration. A concrete stack is used as supporting structure for the plastic tubes. Maintenance of the stack is low, only the few tube connections have to be inspected at certain intervals.

19992 APTIC NO. 38640

Burns, D. McN., G. T. McPherson, C. J. Mayes, J. C. Parnell, R. F. Purvis, M. P. Becker, and G. H. Treuren

AN AUTOMATIC TELEPHONE NETWORK IN A HYDROGEN SULPHIDE LADEN ATMOSPHERE. *New Zealand Eng., 27(1):3-21, Jan. 15, 1972. 11 refs.*

The Rotorua district of New Zealand is a very geothermally active region with many geysers, hot lakes, mud pools, and hot mineral baths constantly emitting hydrogen sulfide, usually mixed with carbon dioxide. When an automatic telephone network was to be set up in the area, the corrosive properties of H2S and its effects on network materials had to be considered in the design of the telephone system. The characteristics of the locality, wind conditions, height of the wires above ground, daily and seasonal H2S concentrations, and precipitation were examined. The potential effects of the H2S on telecommunications and possible protective measures were considered. The methods considered, experimental results with protective coatings and finishes, and the equipment protection adopted as most efficient are outlined. A combination of air purification techniques and protective finishes was chosen for best results. Hydrogen sulfide detectors were also included for gas monitoring.

19993 APTIC NO. 380390

Naughton, D. A.

POLLUTION PROTECTION FOR PEOPLE, PLANTS, AND MACHINES (?). *Locomotive, 58(7):146-152, Fall 1971.*

Examples are given of damage to electrical and mechanical equipment caused by exposure to air contaminants or, in the case of air-ingestion apparatus, by consumption of polluted air. Special emphasis is placed on errosive or corrosive attacks that gradually lead to equipment breakdowns and to the consumption of solids or liquids in quantities which cause sudden breakdowns. To reduce unscheduled business interruptions, serious attention should be given to the environment in which new machinery and electrical apparatus will operate. A major consideration in the ultimate location should be the actual ambient conditions, which can usually be quite logically predicted. Knowing the conditions, it is possible to weigh the cost of various alternatives and select the most practical. It is also practical to study the costs of cleaning, to determine preventive maintenance functions, and to estimate the consequences of an outage.

19994 APTIC NO. 38201

Oukawa, Hironori and Kiyoshi Yoshida

ESTIMATION USED IN WIND-BELL. A TRIAL AT AMAGASAKI CITY. *(Furin chosa. Amagasaki-shi no baai). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):461, 1971.*

A short-term investigation which any citizen can easily join was carried out to estimate air pollution. Corrosion of brass, aluminum, and galvanized iron plates hung to a wind-bell were examined 1, 3, and 6 mo after the start of the test. These plates were classified into five groups and a distribution map was drawn according to the level of corrosion. Brass plates turned brownish black after 1 mo and existence of hydrogen sulfide was proved. Regional differences in pollution was seen from aluminium plates after 3 mo exposure becoming clearer after six months. Serious air contamination at the southern industrial district was recognized. Corrosion was found only six months later in galvanized iron plates. This method was effective to awaken the attention of citizens to environmental hazards.

19995 APTIC NO. 38674

Yamada, Hiroshi, Masaki Saruwatari, Junko Kataoka, Hiroko Hashimoto, Yoko Nakayama, and Yoshio Ikutani

ON EFFECTS OF AIR POLLUTANTS ON DYE GOODS, 4TH REPORT. *(Taiki osen seibun ga sanshokubutsu ni oyobosu eikyo ni tsuite, Dai 4-po). Text in Japanese. Kyoto Municipal Inst of Dyeing and Weaving (Japan), p. 43-44, 1970.*

Following the previous study under which dye goods were exposed in the atmosphere in order to find out the effects of air pollution on them, this experiment was conducted to investigate the effect of a single particular pollutant, nitrogen oxides in this case, on dye goods. In the test, 115 different kinds of direct dyestuff were used to dye cotton cloth, producing 230 test samples, The dyeing density was 0.1% to 1%. The test method was in accordance with JIS, L-0855. The self-recording colorimeter, Shimazu RC-3, was used for the colorimetric measurement, and effects causing change or fading of the color observed from spectrum. As a result of the observation, the test samples were classified into four groups as indicated below, based on their reflectivity spectrum: 1) Color change: those indicating shifts in wavelength; 2) Color fading: those early indicating change in reflectivity; 3) Color change plus fading: those showing 1) and 2) both; 4) those indicating no change. Those sample dyestuff falling under either 1), 2) or 3) were broken down by color as given below. Blue, 21 items (of total 27 samples); Yellow, 5 (20); Red, 5 (23); Brown, 4 (12). Those giving the above-noted change(s) and with known constitutional formulas were further reviewed in relation to the functional group. This revealed that many of those giving the color change or color change/fading comprised -NH2 and that some of those giving no change or the color fading comprised -CH3, -COONa and/or -NHCONH groups, while none of those giving the color change or color change/fading included them.

EFFECTS-ECONOMIC

19996 APTIC NO. 38289

Ministry of International Trade and Industry (Japan)

CORRELATIVE CHART OF INDUSTRIES FOR THE ANALYSIS OF ENVIRONMENTAL HAZARD. ANALYSIS OF SULFUR OXIDES POLLUTION IN KANTO LITTORAL DISTRICT. *(Kogai bunseki yo sangyo renkanhyo ni tsuite. Kanto rinkai chiiki ni okeru io sankabutsu no buseki). Text in Japanese. 103p., 1970 (?).*

A correlation chart of industries incorporated with factors for environmental pollution was designed; this was applied to analyzing environmental hazards. Only sulfur oxides were considered as a factor of pollution. Cost structure for productive and preventive activities such as production and expenses for pollution control and the amount of sulfur oxides emitted or eliminated in 1970 were examined for 1700 factories in Kanto littoral district (Saitama, Chiba, Kanagawa, and Tokyo) as a model of analysis. Based on these data, emission amounts of pollutant per unit production, expenses for preventive activies for pollution per unit amount of sulfur that can be eliminated, amounts of pollutants that can be eliminated per unit amount of occurring pollution were introduced as parameters for analysis of productive activity, preventive activity, and emission and elimination of pollutants. A correlation chart of industries in 1968 was estimated from the same kind of data in 1965; that of 1975 was calculated from the data in 1970 with due regard to various information of long-term plans and from above-mentioned parameters. As a result of the analysis, expense for pollution control in 1968 reached 0.9% of total expenses, which showed that general interest for pollution was low. The amount of pollutant per approximately .03 million dollars of final demand in each industry was 27.4 kg. Concerning 1975, the amount of pollutants was estimated 2.07 times that of 1968; expenses for pollution control were projected to reach 1.8% of total expenses. With increase of preventive activities, the eliminating rate of pollutants increased from 9% in 1968 to 21% in 1975; however, the amount of pollutants to final demand was estimated twice that of 1968. Supposedly, pollution level will increase with the advance in economic activity. Promotion in preventive activities, investment and technical development for pollution control were considered to be necessary.

19997 APTIC NO. 38624

Bonner and Moore, Associates, Inc., Houston, Tex.

AN ECONOMIC ANALYSIS OF PROPOSED SCHEDULES FOR REMOVAL OF LEAD ADDITIVES FROM GASOLINE. *Office of Air Programs Contract 68-02-0050, Rept. APTD-0703, RGH-015, 224p., June 25, 1971. 31 refs.*

NTIS: PB 201133

The economic impact of various gasoline removal schedules was investigated. These schedules varied in rapidity of lead removal and in the number of gasoline grades produced. Eleven proposal schedules were grouped into two classes, one related to a two pump market system, the other to a three-pump system. In all cases one grade of gasoline was required to be lead-free by 1974 to satisfy the needs of any 1975 model cars equipped with exhaust reactors requiring unleaded fuel. The basic research octane level of this gasoline was set at 93 RON. A feasibility analysis, which was required for all eleven schedules, examined approximate capital costs, pool octane numbers, aromatic concentrations, prime blending component requirements, and year-to-year rates of increase in gasoline volume times octane. A preliminary selection was made of the slowest and fastest lead removal schedules for three-grade cases and for two-grade cases. Spot year detailed analysis of all schedules was also determined. A detailed summary of the methodology and the conclusions is included. (Author abstract modified)

19998 APTIC NO. 38355

Ayres Edward

THE ECONOMIC IMPACT OF CONVERSION TO A NONPOLLUTING AUTOMOBILE. *International Research and Technology Corp., Washington, D. C., Dept. of Transportation Contract PS-01040, DOT/OST/TPI-30, IRT-R- 12, 95p., Dec. 30, 1969. 40 refs.*

NTIS: PB 199925

The economic impact of a changeover in the production of automotive power plants in the United States from the conventional internal combustion engine to a nonpolluting engine was investigated. The effect of such a change on the automobile industry, manufacturers of engine electrical equipment, the wholesale and retail trade, auto repairs and service, oil and gas industries, the primary lead industry, iron and steel industries, fabricated metal products manfacturers, metalworking machinery producers, and machine shop products plants is considered. Regional impacts for each of the states are tabulated. The impact of the changeover would be felt in nearly every sector. The greatest impact, however, would be that on the autom manufacturing industry. The magnitude would be strongly dependent on the changeover schedule; the longer the schedule, the smaller the impact.

19999 APTIC NO. 38612

Gerdman, Peter and Jan Thorson

DOES MOTORING COST TOO MUCH? (Kostar bilismen for mycket)? Text in Swedish. Tek. Tidskr., 101(18):26-27, 29, Nov. 1971. 7 refs.

Motoring should bear its own costs, and be made responsible for the damages caused just as other fields of transportation. The costs for road construction and maintenance, and those due to accidents, damages to environment which latter amount to some 500 million dollars yearly, according to an evaluation, are paid by taxpayers. Steps taken to control traffic accidents and air pollution by exhaust gases are not able to solve the problems due to the intense growth of road traffic and transportation. The tendency toward larger and heavier trucks is observed. The advantages involved in public transportation and railroads are emphasized.

20000 APTIC NO. 38552

Haard, Bertil

EXPENSIVE SULFUR. *(Kostbart svavel). Text in Swedish. Tek. Tidskr., 101(17):4, Oct. 1971.*

Criticism is given of a program suggested by the Environmental Protection Authority (Naturvardsver) according to which the sulfur content of fuel oils should be successively reduced by 1980. Reductions from the present 0.5-0.6% to 0.1% are suggested for heavy oils, and undistilled heavy oils with a sulfur content exceeding 1% should be banned all over the country as are now in Stockholm and Goteborg. Apart from the above measures, others should be taken to reduce sulfur dioxide emissions, at costs corresponding to those of desulfurizing undistilled oils to 1%. Refining and desulfurization processes could be modified only at high expense. Desulfurization can be made at relatively low cost by utilizing the excess hydrogen from the reforming process. In this manner, a sulfur content of 0.1-0.3% can be obtained. The desulfurization costs would lie at about $2/cu m of S. The total costs of the program would amount to $200 million yearly by 1980, with a share of $44 million yearly for the desulfurization of distilled oils. The damages caused by sulfur dioxide could be reduced by centralization of thermal plants and by building high stacks. Thus, no harmful biological effects could be detected in the surface layer of air, due to the intense dilution. Sulfur dioxide is supposed to cause damages to forests and lakes due to its acidifying effect. For all the damages caused by sulfur, the program should be preceded by an investigation of a reasonable proportionality of the effect of the program to the costs required.

20001 APTIC NO. 38418

Johnson, V. Webster

AIR POLLUTION IN RELATION TO ECONOMICS. *Interdepartmental Committee on Air Pollution, Washington, D. C., Air Pollut., Proc. U. S. Tech. Conf., Washington, D. C., 1950, p. 37 - 40. 1 ref. (May 3-5, Louis C. McCabe, ed.)*

An economic evaluation of air pollution effects serves to determine the value of the losses suffered in the absence of a control program, to appraise the costs and benefits of different methods of control, and to estimate the extent and incidence of the benefits of control, thus providing a basis for allocating control costs between public and private beneficiaries. The distinctions between (1) the public and private and (2) tangible and intangible aspects of both control costs and benefits are discussed. In making an economic assessment, it is first necessary to obtain reliable data on the physical effects of pollution. Insofar as possible, these effects should be translated into monetary terms. A clear qualitative evaluation of effects not subject to quantitative measurement is important, since they may be strategic in policy determinations. The economic problem of evaluation in air pollution is largely one of determining the effects with or without a program or with varying degrees of intensity of a program, although decisions are never made solely on economic grounds.

20002 APTIC NO. 38409

Lux, H.

FOREST DAMAGES CAUSED BY SMOKE IN SLOVAKIA. *(Forstliche Rauchschadprobleme in der Slowakei). Text in German. Soz. Forstwirtsch., 21(2):60-62, 1971.*

Proceedings of the Forest and Industrial Emissions Conference held in Slovakia are reviewed. In Czechoslovakia, the total sulfur dioxide emission amounts to 3.4 million t/yr, causing approximately $.09 billion damage to forestry. The corresponding damage caused to forestry in Slovakia lies at $.03 billion. A total forest area of 160,000 ha is affected by air pollution in Czechoslovakia, of which 27,000 ha lie in Slovakia. The damaged agricultural area totals some 600,000 ha. The investments for technical pollution control measures amounted to $1.29 million in 1968, and $5.16 million in 1970. The forestry areas hit hardest by pollution lie in the Erzgebirge (more than 100,000 ha) and in the Ostrava region, with chemical plants and thermal power plants as basic pollution sources. Soil analyses and sensitivity investigations as well as a new method of growth measurement are briefly described. Increasing soil acidification due to sulfur dioxide, chlorine, hydrogen chloride, and hydrogen fluoride gases results in reduced biological activity of the soil, and in nitrogen deficiency. Diagnostic methods and possible connections between emissions and insect proliferation are referred to.

20003 APTIC NO. 38079

Schwartz, Seymour

PROBABILISTIC MODELS FOR CALCULATING AIR POLLUTION DAMAGE. *J. Environ. Syst., 1(2):111-131, June 1971. 14 refs.*

A decision process that weighs the real benefits of pollution control, i.e., the reduced incidence of undesirable effects, against the costs of control requires the prediction of future damage. An alternative to a cost-benefit evaluation is the use of damage statistics which display the effects of pollution on different segments of the population. Probabilistic models were developed to yield both the expected value statistic for use in a cost-benefit evaluation and the percentage-frequency relationships which show the distribution of damage as well as the amount. The probabilistic response characteristic for the transformation of air quality information to damage information is presented and illustrated with actual eye irritation data on oxidants. The submodels for complete damage calculation and their interconnections are considered. The model accounts for time and geographical variations in pollutant concentration, as well as variability in human response to pollution. (Author abstract modified)

STANDARDS AND CRITERIA

20004 APTIC NO. 38197

Ministry of Health and Welfare (Japan), Public Nuisance Section

STANDARD OF SOOT AND DUST EMISSION (INJURIOUS SUBSTANCES) BASED ON AIR POLLUTION CONTROL LAW. *(Taikiosen boshiho ni motozuku baien (ugai bussitsu) no haishutsu kijun ni tsuite). Text in Japanese. 69p., May 1971.*

Standards of emission of soot and dust, cadmium and its compounds, chlorine and hydrogen chloride, fluorine and its compounds, and lead and its compounds are discussed. The emergency contamination level is mentioned. A summary of the report of the experts conference on the criterion of soot and dust emission includes standards of emission for newly established or existing facilities, the characteristics and collection rate of soot and dust at different emission sources, the consumption of fuel, the amount of soot and dust at six prefectures in 1969, and the standard of emission from the special facilities provided by ordinance. Concentrations in the air, effects on man, the standard value of concentrations in the ambient air or standards of emission were discussed fro Ca, Cl, HCl, F, and Pb. Emergency measures and alarm systems during an emergency in Los Angeles and New York discussed with relation to the Air Pollution Control Law.

20005 APTIC NO. 38319

U.S.A.: A NEW AIR POLLUTION ABATEMENT LAW. *(USA: una nuova legge per limitare l inquinamento atmosferico). Text in Italian. Inquinamento, 13(7):46-47, Sept. 1971.*

The U. S. Congress has approved legislation designed to reduce the emission of vehicular pollutants. New measurement methods of pollutant levels have been introduced. Thus, where in 1970 an automobile met existing standards by emitting 2.2 g/mi hydrocarbons and 4.6 g/mi carbon monoxide, the newly introduced measurement methods would register 4.6 g/mi C and 47 g/mi CO. For the first time the U. S. has adopted norms for ambient air quality valid on a federal scale. For sulfur dioxide and particulates, primary and secondary standards have been adopted. The former define air quality deemed necessary with a margin of safety to protect public health. The latter define air quality deemed necessary for the protection of the public welfare from the noxious effects of known pollutants and of pollutants which could crop up in the future. These norms are subject to revision by the director of the Environmental Protection Agency. It is left to the states to promulgate norms which can be stricter than federal standards. The new norms call for a maximal emission in 1975 of 0.46 g/mi of nitrogen oxides, 4.7 g/mi of hydrocarbons, 3 g/mi of CO, and 2 g by the evaporation test.

20006 APTIC NO. 38692

ENVIRONMENTAL PROTECTION AGENCY. STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES. PROPOSED STANDARDS FOR FINE CATEGORIES. *Combustion, 43(4):17-19, Oct. 1971.*

The publication of proposed Federal regulations which set forth requirements and establish procedures related to the implementation and enforcement of standards of performance of five previously announced stationary source categories is reported. The test method applicable to particulate emissions is outlined. The apparatus comprises a sampling train, nozzle, probe, pitot tube, filter holder, impingers, metering system, and a barometer, as well as various graduated cylinders, weighing dishes, and reagents. After selecting the sampling site and the minimum number of sampling points, the stack pressure, temperature, moisture, and range of velocity head are determined. The method differs from that of the American Society of Mechanical Engineers.

20007 APTIC NO. 38578

Duprey, R. L.

THE STATUS OF SOX EMISSION LIMITATIONS. *Chem. Eng. Progr., 68(2):70-76, Feb. 1972. 7 refs.*

The Clean Air Act, as amended, will undoubtedly result in more stringent sulfur dioxide limitations to achieve the national ambient air quality standards. In addition, many jurisdictions are expected to reduce the sulfur content of fuels to less than 0.3%, and the Environmental Protection Agency has proposed restricting sulfur oxides emissions from new steam-generating plants to 0.8 and 1.2 lb/million Btus of heat input for liquid and solid fossil fuels, respectively. Present state and local restrictions on fuel sulfur content, which are tabulated together with emission standards in equivalent sulfur levels, range from 0.3% to 2.7% for fuel oil and 0.2% to 3.6% for solid fuel. The new restrictions will have a substantial impact on the coal industry and petroleum refinery operations faced with the desulfurization of petroleum products. Sulfur recovery plants will need to operate more efficiently in removing sulfur from petroleum refining, natural gas processing, and coke oven gas. Control techniques employing tail-gas cleaning are available to reduce sulfur oxide emissions well below 0.01 lb of sulfur processed. Primary nonferrous smelters are faced with regulations that require about 90% reduction in sulfur oxides emissions. Existing sulfuric acid plants are expected to be restricted to 6.5 lb of sulfur oxides/ton of acid and new plants to 4.0 lbs of sulfur oxides/ton of acid.

20008 APTIC NO. 38314

Einbrodt, Hans Joachim

LIMIT VALUES FOR DUST-LIKE AIR POLLUTANTS AND OTHER COUNTER-MEASURES. *(Grenzwerte fuer staubfoermige Luftverschmutzungsstoffe und andere Bekaempfungsmassnahmen). Text in German. Preprint, Technische Hochschule, Aachen (West Germany), Abteilung fuer Hygiene und Arbeitsmedizin, 4p., 1971.*

Establishing limit values is a difficult and necessary task. In order to arrive at reasonable limit values, air pollutants and their emission sources must be determined. The concentration of these pollutants has to be measured. The occurring air pollutants must be subjected to biological tests; the effects on man, animals, and plants must be examined. For these biological tests, pollutant combinations with varying concentrations must be simulated. For dusts, a classification according to harmfulness has been established. Group Ia lists all acute toxic dusts (asbestos, arsenic, beryllium, cadmium, and six-valent chromium compounds); Group I contains all dangerous dusts (soluble barium compounds, iodine and iodine compounds, tellurium, quartz, and tungsten-carbide); Group II lists substances which have a negative effect on a limited number of biological groups (manganese compounds, molybdenum, aluminum carbide, calcium oxide, and basalt); and Group III lists the largely inert dusts (gypsum, iron oxide, potassium compounds, and dolomite). It remains to be tested whether the last grouping is pertinent in any case. For the above groups the following limit values have been recommended: Group Ia, 20 mg/cu m; Group I, 50 mg/cu m; Group II, 100 mg/cu m; and Group III, 150 mg/cu m.

20009 APTIC NO. 38179

McNesby, J. R., R. Byerly, Jr., and Wing Tsang

CALIBRATION STANDARDS VIA PYROLYSIS. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:63, 73, Jan. 1972. 11 refs.*

GPO: C 13.46:711

Known concentrations of air pollutants were synthesized through pyrolysis of larger and more stable molecules, i.e., a pollutant molecule into which the pollutant decomposed and an easily measured hydrocarbon molecule. Though tests were limited by the insensitivity of the detection devices, the approach worked for formaldehyde, acetaldehyde, sulfur dioxide (butadiene sulfone), and butadiene (cyclohexane).

20010 APTIC NO. 37784

Popov, T., K. Basmadzhiyeva, G. Kurchatova, K. Davidkova, and L. Neykovska

THE COMPLEX EFFECT OF CHEMICAL SUBSTANCES POLLUTING SIMULTANEOUSLY WATER AND AIR. *(Kompleksnoye deystviye khimicheskikh agentov, zagryaznyayushchikh odnovremenno vodu i vozdukh). Text in Russian. Gigiena i Sanit., no 12:77-79, March 1972. 6 refs.*

Maximum allowable concentrations of dinitro-o-cresol in air and water were determined in preliminary tests in animal experiments. In air, concentrations of 0.002 mg/cu m and 0.001 mg/cu m were below-threshold values for short-term and chronic exposures, respectively. The maximum allowable concentrations determined experimentally were 0.002 mg/cu m (one-time concentration) and 0.001 mg/cu m (daily average). The maximum allowable concentration in water, as determined on the basis of organoleptic properties, was 0.05 mg/l, while sanitary water analyses revealed to maximum allowable value of 25 mg/l. Chronic sanitary-toxicologic experiments revealed the ineffective dose to be 0.0025 mg/kg, i.e., 0.05 mg/l (1/10,000 of LD50). The maximum allowable concentration recommended was 0.05 mg/l. In animals subjected to chronic treatment orally or through inhalation with doses of 0.005 mg/kg and 0.001 mg/cu m, the concentrations were totally ineffective.

20011 APTIC NO. 38313

Rondia, D.

TOXICOLOGY, EPIDEMIOLOGY AND STATISTICS OF AIR POLLUTION. *(Toxicologie, epidemiologie et statistique de la pollution de l air). Text in French. Arch. Belges Med. Sociale Hyg. Med. Travail Med. Legale (Brussels), vol. 28:38-43, Jan. 1970. 3 refs.*

In view to the knowledge acquired in the past few years in the areas of the toxicology and epidemiology of air pollutants, fixations of national norms can be anticipated in the near future for air pollutants in man s environment. The difficulties involved in such legislative measures are shown by investigations in Liege, and a norm draft in Holland. Whenever maximum pollutant concentrations are fixed, sulfur dioxide is primarily emphasized due to the large volumes emitted and the easiness of its detection in atmosphere. Sulfur dioxide toxicity was thoroughly studied in the United States. In Holland, epidemiological studies were carried out and norms were established (mean daily concentration for consecutive 365 days 150 micrograms/cu m, and 300 or 350 and 600 or 700 micrograms/cu m for shorter periods, i.e., for one week and one day, respectively). The advantage of these norms lies in the fact that they were established in the knowledge of the existing conditions. Establishing a single concentration as a norm is, however, not sufficient for toxicological purposes. Air pollution caused by sulfur dioxide was measured daily in center city Liege in the period 1960-65. According to these tests, sulfur dioxide concentrations in Liege lie, during the five years considered, slightly below the suggested value of 150 micrograms/cu m, and also very high concentrations (over 700 micrograms/cu m, for 24 hours) occur at a frequency slightly below the suggested, in spite of the rather unfavorable geographic situation. Though the Dutch norm draft for sulfur dioxide is more realistic and more complete than others, it is still ambiguous, since it can be regarded as a graphic representation of a toxic effect, and as a graphic representation of concentration frequencies not allowed to be exceeded.

20012 APTIC NO. 38101

Stoefen, Detlev

THRESHOLD LIMITS FOR AIR POLLUTANTS IN RESIDENTIAL QUARTERS. *(Hoechstwerte fuer Luftverunreinigungen in Wohngebeiten (MIK-Werte). Text in German. Staedtehygiene (Uelzen/Hamburg), 22(2):51-54, Feb. 1972. 8 refs.*

The maximum allowable emission concentrations (MIC) of air pollutants in residential districts in West Germany are listed together with those of the USSR. With a few exceptions, the German values are much higher than the Russian values. Moreover, some important pollutants are not included on the German list. The Soviet values, elaborated on a large scale for 40 years, are a valuable tool in the fight against air pollutants. The German limits on sulfur dioxide are 0.5 mg/cu m (long-term value) and 0.75 mg/cu m (short-term value); the USSR limits are 0.05 mg/cu m (diurnal average) and 0.5 mg/cu m (single emissions). Emissions or nontoxic dusts, nitrogen dioxide, and soot are not controlled in West Germany. Soviet MICs for these pollutants are: nontoxic dusts, 0.5 mg/cu m (single emissions) and 0.15 mg/cu m (diurnal average); NO2, 0.85 mg/cu m (both single emission and diurnal average); soot, 0.15 mg/cu m (single emission) and 0.05 mg/cu m (diurnal average).

LEGAL AND ADMINISTRATIVE

20013 APTIC NO. 37786

SUPERVISORS ADOPT NEW RULES TO AID VISIBILITY. *APCD (Air Pollut. Control Dist.) Dig., 11(1):1, 4, Jan. 1972.*

In Jan. 1972, the Los Angeles Air Pollution Control district adopted new rules which will further control the emission of particulate matter from stationary sources. The new rules reduce the allowable opacity of visible emissions from Ringelmann 2 to Ringelmann 1 for no more than 3 min in any hour; they reduce the presently allowable concentration of 0.3 g particulate matter/scf of effluent gas to a maximum of 0.2 for small sources and to 0.01 for larger sources; they also require additional reductions of as much as 60% in dust and fumes discharged; and they further reduce allowable emissions from multiple-chamber incinerators.

20014 APTIC NO. 37837

THE FIGHT AGAINST AIR POLLUTION IN BELGIUM. *(Lutte contre la pollution atmospherique en Belgique). Text in French. Tribune CEBEDEAU (Centre Belge Etude Doc. Eaux), 24(337):569-670, Dec. 1971.*

Resolutions regarding the creation of special air pollution control zones and limits for carbon monoxide content in automobile exhaust are presented. The special protection zones are established on the basis of annual averages from sulfur oxides measurements, exceeding 150 micrograms/cu m. Peat and lignite must not be used as combustibles for heating purposes. The maximum allowable sulfur content in liquid combustibles is 1% by weight, and solid combustibles are allowed to contain a maximum of 1% by weight of volatile sulfur. Open-air destruction of wastes by incineration is prohibited. The allowable carbon monoxide content in exhaust gases from spark ignition engines is limited to 4.5%, while a maximum of 5.5% is tolerated until Oct. 1, 1972. Test procedures are specified. The absolute error of measurement should not exceed 0.25%.

20015 APTIC NO. 37943

Toyama Prefecture (Japan)

TOYAMA PREFECTURAL WHITE PAPER ON ENVIRONMENTAL POLLUTIONS REPORT FOR 1970, ADMINISTRATIVE ACTIONS FOR 1971. *(Toyama-ken kogai hakusho, showa 45 nendo nenji hokoku, showa 46 nendo no shisaku). Text in Japanese. 186p., Aug. 1971.*

The situation of environmental pollution consists of air, water, noise pollutions, and odor pollution. Complaints due to environmental pollution are mentioned. Air pollution tends to be high in the Toyama-Takaoka area and Uozu or Kurobe. Falling soot and dust occurs locally in Toyama, Takaoka, and Shin Minato cities where smelting and iron factories are located, but it tends to decrease annually. In the first two cities, sulfur oxides concentrations which exceed the environmental standard is observed. The floating dust is generally low. Pollution due to fluoride compounds or carbon monoxide is considered to be important as a future problem. The poultry industry and hog raising are sources of bad odors, and the marine products industry is also a problem. Actions for the prevention of environmental pollution, countermeasures taken for each kind of pollution, and fundamental measures are explained. Items on the environmental atmosphere, a plant survey, environmental health measures, polluted soil, and countermeasures for farming crops, are explained. Fundamental preventive measures that are scheduled to be taken for 1970 and concrete actions for each kind of pollution are also discussed. The Itai-Itai disease and the Toyama Prefectural Ordinance for preventing environmental pollutions are mentioned.

20016 APTIC NO. 37982

FORD S ANTI-AIR POLLUTION LABORATORY IN ENGLAND. *(Fords anti-luchtvervuilings-laboratorium in England). Text in Dutch. Polytech. Tijdschr., Ed. Werktuigbouw., 27(4):108-110, 1972.*

The Ford Motor Company recently opened a new laboratory in Dunton, England, for research and development in the field of auto exhaust gases. The majority of the activities in this center will be directed toward research on the improvement of engines and parts, and the remainder toward testing of current models (for meeting certification requirements and production control (5%) and improving test methods (10%). Six test cells are available, each provided with a treadmill for carrying out a computer-indicated driving program, and with fans for simulating the flow of air past a moving vehicle. Exhaust gases are collected in plastic balloons, then subjected to infrared, ultraviolet or flame-ionization analysis; continuous analysis of exhaust gas and determination of evaporated gasoline vapors are also possible. Computers display the data obtained in graphic form alongside the driving program tracing, or in tabular form for various points in the cycle. A fleet of 100 autos has been set aside especially for test purposes. Approximately 15,000 tests/yr can be performed in the six test cells. All safeguards for personnel health have been provided.

20017 APTIC NO. 38125

PRINCIPAL LAW SUITS AGAINST PUBLIC NUISANCE IN JAPAN. *(Zenkoku no omona kogai sosho). Text in Japanese. Kankyo Hakai (Environ. Destr.), 2(13):50-51, Nov. 1971.*

The principal lawsuits against public nuisance by the Japanese public were published in the Mainichi Newspaper of September 29, 1971. Those concerning air pollution are suits in Yokkaichi and Yoshida-cho, Hiroshima Prefecture. In Yokkaichi, nine plaintiffs charged the Showa Petroleum, Mitsubishi Petrochemical, Mitsubishi Chemical Engineering, Mitsubishi-Monsant Chemical Engineering, Central Electric, and Ishihara Industries for pollution of the air which caused two deaths and some severe asthmatic attacks. One hundred more victims are expected to sue the above listed companies in the near future. In Yoshida-cho, Hiroshima prefecture, 135 citizens have appealed for a temporary injunction against the construction of an incinerator and a sewage treatment plant for possible pollution. These incidents are presented in a table form.

20018 APTIC NO. 38260

SWEDEN PLANS TO DISPLACE INDUSTRIES INTO REGIONS WHERE THEY DO NOT ENDANGER THE ENVIRONMENT. *(Schweden will industrien umweltfreundlich verlegen). Text in German. VDI (Ver. Deut. Ingr. Nachr. (Berlin), 26(11):9, March 15, 1972.*

Industries in Sweden which have a harmful influence on the environment will be concentrated in 17 regions which are already more or less polluted. Other regions not at all affected by harmful environmental influences shall be kept in a clean status. The Swedish Civil Ministry proposed in its memorandum to limit the construction of new summer houses to five regions so that practically the whole coastal region including the islands of Stockholm will be concerned by the restriction of construction. By these measures the Swedish Ministry wil protect nature and the environment against detrementous influences and thus maintain special regions of the country for recreation for the population.

20019 APTIC NO. 38482

CONTROL OF AIR POLLUTION: EMISSIONS OF GASEOUS POLLUTANTS BY THE PETROL ENGINES OF VEHICLES. *Intern. Digest Health Legislation, 22(2):212-213, 1971.*

Abatement legislation in France with respect to emissions of gaseous pollutants by petrol engines is defined. Car testing, control specifications, and operating criteria are delineated. Type I tests verify the average emission of pollutants in a congested urban area after a cold start; type II tests determine carbon monoxide emission at idling speed; and type III tests verify crankcase gas emissions.

20020 APTIC NO. 38483

ENVIRONMENTAL PROTECTION AND QUALITY. *Intern. Digest Health Legislation, 22(2):401-402, 1971.*

Legislation passed by the federal government establishing the Environmental Quality Council and the Citizens Advisory Committee on Environmental Quality is presented. The act contains provisions for the structure, composition, functions, and purposes of these bodies.

20021 APTIC NO. 38484

CONTROL OF AIR POLLUTION. *Intern. Digest Health Legislation, 22(2):389-391, 1971.*

Amendments to the Clean Air Act are outlined with respect to planning grants to air pollution control agencies, research provisions for fuel and vehicle studies; provisions for interstate air pollution control agencies; the establishment of air quality standards; and emission standards studies.

20022 APTIC NO. 38485

ENVIRONMENTAL HYGIENE: FUNCTIONS IN THE FIELD OF ENVIRONMENTAL PROTECTION ASSIGNED TO THE MINISTER RESPONSIBLE FOR THE PROTECTION OF NATURE AND THE ENVIRONMENT. *Intern. Digest Health Legislation, 22(2):240-241, 1971.*

The functions of the Minister-Delegate responsible for the protection of nature and the environment in France are outlined. The Minister is responsible for the prevention, abatement, or elimination of all forms of pollution and nuisances. Responsibilities within the jurisdiction of other ministers, provisions for an Interministerial Committee, and the structure of the office are delineated.

20023 APTIC NO. 38664

Japan Environmental Agency, Tokyo Bureau of Atmospheric Safety

SUMMARY OF PARTIAL REVISION OF AIR POLLUTION CONTROL ENFORCEMENT REGULATIONS BY THE OFFICE OF THE PRIME MINISTER. *(Taiki osen boshiho shiko kisoku no ichibu o kaisei suru sorifurei yoko). Text in Japanese. 12p., Dec. 1971.*

Partial revisions of the Air Pollution Control Enforcement Regulations are given and explained. The main points of revisions include the application of more strict emission standards in general; application of more strict standards for the previously designated 25 pollution control districts, 18 of which are now enlarged geographically; application of more strict standards for the emission standards of special pollutants; breakdown of the previous standard K equals 5.26 into three groups, K equals 2.92, 3.50, and 5.26; addition of special emission standard control districts; and geographic expansion of some of the previously designated special control districts. The new standards will be enforced effective Jan. 5, 1972; however, penalties will not be enforced until March 31, 1972.

20024 APTIC NO. 38669

Osaka Prefectural Government (Japan), Div. of Atmosphere

AIR POLLUTION CONTROL LAW INSTRUCTIONAL DATA. *(Taiki osen boshiho setsumei shiryo). Text in Japanese. 14p., 1971.*

Instructions and explanations are given concerning the air pollution control law and the main points of revisions. The organization and system of the law are explained by a flowchart. Regulations are applicable to stack gases including sulfur oxides, soot, general and special toxic gases, special toxic materials, and dust particles. With regard to emission standards, sulfur oxide emission standards are categorized in eight groups and are determined locally. Stack gas, soot, and toxic gas emission standards are determined nationally, and special emission standards are applicable to soot and special toxic gases. Violations in all categories of stack gases are subject to penalties. Standards for special toxic materials are determined case by case at the time of accident. Dust emission standards are determined depending on the structure, use, and maintenance of facilities. These last two items are not subject to penalty. The method of enforcement of improvement orders and the period of improvements are reviewed by a table. Items and facilities that require registration and reporting are reviewed by a table. Facilities designated as soot and stack gas emission sources are reviewed by a table. Emission standards with regard to categories and usage, the old and new standards, and control areas are reviewed by tables and maps. Emission standards of special toxic materials such as cadmium and compounds, chlorine, hydrogen chloride, fluorine, hydrogen and silicon fluorides, and lead and compounds, are reviewed by a table. Dust creating facilities and their management standards are given.

20025 APTIC NO. 38036

Asukata, Ichio and Masayasu Narumi

COMBINATION OF PUBLIC ENTITIES FOR ENVIRONMENTAL POLLUTION. *(Kogai boshi jijitai rengo no koso). Text in Japanese. Jurisuto (Jurist), no. 492:200-202, Nov. 10, 1972.*

Environmental destruction does not respect political boundaries. Air pollution of Tokyo affects Yokohama and vice versa. A need exists for region-wide administration and the establishment of a combination of public entities for environmental protection. It is necessary, for the time being, to establish region-wide cooperation of local governments in order to prevent air pollution, water pollution, and industrial solid waste disposal. Three suggestions are made for this purpose. First, the Environmental Protection Center must be established by related local governments. Second, the joint scientific research and studies system concerning region-wide pollution and environmental protection must be established. Because small cities cannot maintain ample researchers and research institutes, a joint research and monitoring center shall be established and maintained with technological and financial aid from big cities. Finally, a unified, region-wide land use program must be established by cooperation of related local governments. The following arrangements were agreed upon in a Four Mayors Meeting from Kawasaki, Yokohama, Kamakura, and Yokosuka: (1) enlargement of renovated megalopolis by cooperation of the four cities; (2) region-wide administration by cooperation of 14 cities in the Capital Region; (3) publicizing research documents concerning air pollution; and (4) regional land-use control, regulation of urban sprawls, and conservation of green zones.

20026 APTIC NO. 38584

Boeer, Wolfgang

BASIC PROBLEMS IN THE MAINTENANCE OF CLEAN AIR IN THE GERMAN DEMOCRATIC REPUBLIC. *(Einige Grundfragen der Reinhaltung der Luft in der Deutschen Demokratischen Republik). Text in German. In: Technik und Umweltschutz Luft-Wasser-Boden-Laerm. Kammer der Technik, Bronnstofftechnische Gesellschaft in der Deutschen Demokratischen Republik (ed.), Leipzig, VEB Deutscher Verlag fuer Grundstoffindustrie, p. 24-39. 6 refs.*

General aspects of air pollution are outlined. Nationwide efforts are required to reduce air pollution, and to maintain clean air wherever possible. As the emission of pollution increases nearly linearly with production, and the latter shows steady growth, the specific emissions should be sharply reduced. The installation of high stacks, and the proper choice of the sites for industrial plants should be regarded as a temporary solution only. New technologies causing minimum pollution should be developed, and adequate raw materials should be applied. The basic relations in air pollution form a dynamic, non self-adjusting system, which becomes more or less stable due to the incorporation of information connections. In this regard, both collective and individual consciousness of the importance of air pollution control are necessary. Within the meteorological aspects of air pollution, mathematical modeling and formulae deliver correct results, provided that the correct parameters are introduced. They apply, however, to homogenous turbulence fields only. Economic and juridical aspects of air pollution control are outlined. An ideal emission limit is the complex objective which should be approached by designed emission limit values for shorter periods. International cooperation can be instrumental in solving related problems in the German Democratic Republic.

20027 APTIC NO. 38230

Bouquiaux, J.

THE BATTLE AGAINST AIR POLLUTION IN THE U.S.A. in 1970-1971. *(La lutte contre la pollution atmospherque aux USA en 1970-1971). Text in French. Arch. Belges Med. Sociale, Hyg., Med. Travail Med. Legale (Brussels), 29(4):217-228, April 1971.*

The National Environmental Policy Act was signed on Jan. 1, 1970. It established a national environmental policy and created the Council on Environmental Quality, attached to the President s Executive Office. In July 1970, the Environmental Protection Agency was formed whose principal task is to establish and enforce norms, to observe and analyze environmental pollution, make surveys, and assist the states and the city administrations in their programs of fighting pollution. Its function is coordinated with that of the National Air Pollution Control Administration (NAPCA) which is a section of the Department for Health, Education and Welfare (HEW). Considerable work has been done in the last few years, particularly in dealing with the five main air pollutants: carbon monoxide, sulfur dioxide, hydrocarbons, nitrogen oxides, and particulates, which added up to a total nationwide emission of 214 million tons in the year 1968. In Nov. 1967, the Air Quality Act was adopted by Congress, establishing new provisions, including the designation by the Secretary of HEW of particular regions requiring the establishment of air quality standards. Since then HEW has published relevant documents concerning the criteria of air quality and methods for reducing air pollution caused by sulfur dioxide, particulates, carbon monoxide, hydrocarbons, and photochemical oxidizers. Revised emission standards for automobiles were issued by the Secretary of HEW in July 1970, including proposed emission levels for the coming years up to 1975. The NAPCA encourages and subsidizes research and development in various areas, particularly work concerning development of techniques of retaining sulfur dioxide emanating from stationary emission sources and the development of automotive vehicles with low emission levels. At this stage, gas turbine powered and steam driven vehicles are in the foreground of interest.

20028 APTIC NO. 38376

Engels, G.

LAW AND JURISDICTION. *(Aus Gesetz und Rechtsprechung). Text in German. Giesserei (Duesseldorf), 58(26):824, Dec. 1971.*

The catalogue of foundry processes which are subject to stringent emission limitations and thus must be licensed before they can be put into operation has been changed. All plants which melt crude iron or crude steel as well as plants for steel production must obtain a license. Excepted are plants operating on the vacuum melting principle with capacities to 5 tons. The list also includes melting plants for non-ferrous metals including plants for refining. Excepted are plants for vacuum melting and melting of up to 50 kg of light metals or 200 kg heavy metals and melting plants for precious metals, or alloys consisting solely of precious metals. Furthermore, the list pertains to iron, annealing, and steel foundries, foundries for non-ferrous metals with the exception of foundries for bell casting, and art foundries where metallic molds are used. The new list omits the small foundries for non-ferrous metals with the comment that air pollution by these plants is negligible.

20029 APTIC NO. 38304

Fri, Robert W.

TITLE 42--PUBLIC HEALTH, CHAPTER IV--ENVIRONMENTAL PROTECTION AGENCY. PART 420--REQUIREMENTS FOR PREPARATION, ADOPTION, AND SUBMITTAL OF IMPLEMENTATION PLANS. *Federal Register, 36(158):15486-15506, Aug. 14, 1971.*

The revised Federal regulations applicable to the preparation, adoption, and submittal of state implementation plans for national air quality standards (for sulfur oxides, particulate matter, carbon monoxide, oxidants, hydrocarbons, and nitrogen dioxide) are given. Among the principal revisions are provisions for control strategies such as emission charges, taxes, or economic incentive schemes; the requirement that a state must indicate its legal authority to inspect and test motor vehicles or impose land use controls; elimination of the requirement that a state establish a permit system; and the requirement that a state make emission data available to the public. The new regulations also spell out more clearly the requirements for legally enforceable compliance schedules; require at least 30 days notice of public hearings on state implementation plans; eliminate the fixed deadline for requests for preliminary review of state plans; redefine the time allowable for attainment of national secondary standards for sulfur oxides and particulate matter; and require that air quality surveillance systems be in operation not later than 2 yrs after approval of a state plan. Included in the regulations are examples of the emission limitations obtainable with reasonably available control technology.

20030 APTIC NO. 38034

Harada, Naohiko

ENVIRONMENTAL QUALITY STANDARDS AND ENVIRONMENTAL POLLUTION PREVENTION PLAN. *(Kankyo kijun to kogai boshi keikaku). Text in Japanese. Jurisuto (Jurist), no. 492:173-178, Nov. 1971. 14 refs.*

The Basic Law for Environmental Pollution Control provides that the National Government shall prescribe, with regard to air pollution, water pollution, soil pollution, and noise, the environmental quality standards that should be maintained for the protection of people s health and the conservation of their living environment. This provision is stated to be merely a declaration of policy and does not directly create rights or duties of citizens. The present status of environmental standards established by the National Government are examined; that the national standards should be minimal standards which the local governments must adopt, and that local governments regulations should not be preempted by national action is emphasized. Local governments should be allowed to establish more stringent standards than those of the National Government. The Basic Law for Environmental Pollution Control provides that the Prime Minister shall, after submitting the matter to the deliberation of the Environmental Pollution Control Council, indicate basic policies relating to an environmental pollution prevention plan to be executed in a designated area and shall instruct prefectural governors concerned to work out specific plans for the areas. The said Basic Law provides that the State and local public entities shall endeavor to take necessary measures to enforce environmental pollution prevention plans. An argument is presented that the pollution prevention plan should be as administrative guidelines, established upon adequate consideration of each regional pollution status and special fitness of each regional land-use, for the national and local governments agencies. Another purpose of the plan is to inform regional residents and entrepreneurs beforehand about the national basic policy concerning pollution prevention. The needs of local pollution prevention programs, established by local public entities under the participation of regional residents and enterprises, are emphasized.

20031 APTIC NO. 38203

Hattori, Hiroshi

NOMINATION OF ENVIRONMENTAL POLLUTION VICTIMS. *(Kogai kanja no nintei ni tsuite). Text in Japanese. Hoken no Kagaku (Health Care), 13(10):647-649, 1971.*

Environmental pollution induced diseases are the diseases which were designated by law for special measures concerning the relief of health damages caused by environmental pollution. The objective damages are limited to health victims injured by polluted air and polluted water and to areas or diseases which have been designated. No area is related to water pollution, but surveys are going on in some areas as to air pollution. When people have a designated disease within a designated area and wish to have support for medical treatment or other relief measures, the person must file the requisition with the Prefectural Governor, who controls the area. He will make the nomination after hearing the opinion of the Council for Nomination of Environmental Pollution Victims which is set up in each designed area.

20032 APTIC NO. 38282

Ishii, Tatsuo

SPECIAL REIMBURSEMENT OF PUBLIC NUISANCE CONTROL FACILITIES. *(Kogai boshi shisetsu to no tokubetsu shokyaku). Text in Japanese. Sangyo Keiei (Ind. Manage.), 32(1):74-80, Jan. 1972.*

The special compensation system for installations of public nuisance control facilities are explained. The legal clause is included in the Special Tax Exemption Law Code No. 43 and designates the qualifications for such reimbursement on both individual and industrial levels. The law went into effect as of April 1, 1971. Facilities for treatment of stack gas and soot (tanks, towers, water channels, reservoirs) and equipment for treatment (exhaust pipes, emission pipes, gas coolers, induction ventilators, compressers, dust eliminators, dust conveyors, dust storages, mist eliminators, automatic adjusters, transformers, flow adjusters, gas ducts, electric motors, pumps, and pipes) have been installed between April 1, 1969 and March 31, 1973. Definitions for treatment facilities, soot and stack gas, dusts, and air pollutants are given, and the method of calculating the cost is given.

20033 APTIC NO. 38676

Laamanen, Arvo

INTERNATIONALITY OF AIR POLLUTION. *(Ilmansuojelun kansainvalisyys). Text in Finnish. Tyoterveysuutiset, 1969: 4-6, Jan. 1969.*

Most air pollution control research is conducted in the United States because such research demands highly specialized personnel and is expensive and time-consuming. However, many small countries are now combining resources and creating organizations such as Nordforsk, an air pollution control group consisting of representatives from Finland, Sweden, Norway, Denmark, and Iceland. The United States also arranges opportunities for study for representatives from different countries. Its Air Pollution Technical Information Center will be a depository for air pollution information from all over the world and will ensure the availability of up-to-date information.

20034 APTIC NO. 38174

McNesby, J. R., R. Byerly, Jr., John K. Taylor, and Rolf A. Paulson

NBS AIR SAMPLING STATION. *Natl. Bur. Std. (U. S.) Tech. Note, no. 711:51-52, 73. Jan. 1972. 11 refs.*

GPO: C 13.46:711

An air-monitoring station on the National Bureau of Standard site in Washington, D. C., is now in operation for measurement of total particulates, dust fall, and sulfation. Other measurements will be made as equipment becomes available. The station will provide the NBS staff with firsthand information on the problems involved in air quality measurements.

20035 APTIC NO. 38061

Miller, Stanton and Carol Lewicke

AIR POLLUTION OVER THE STATES. *Environ. Sci. Technol., 6(2):111- 117, Feb. 1972.*

The status of state implementation plans for meeting the 1975 national air quality standards is reviewed together with modeling procedures followed by different states and state enforcement actions, monitoring networks, and progress in establishing primary and secondary standards. Problems in establishing standards for interstate air quality control regions are noted as are the economic and technological problems that emission standards pose for specific industries.

20036 APTIC NO. 38231

Muroi, Tsutomu

THE RELATIONSHIP BETWEEN LAW AND ORDINANCE TO CONTROL POLLUTION. *(Kogai taisaku ni okeru horitsu to jorei). Text in Japanese. Jurisuto (Jurist), no. 492:166-172, Nov. 10, 1971. 17 refs.*

The right of the local governments to pass more stringent pollution control standards than national standards is examined. Recently, the national standards have been greatly strengthened by new enactments or amendments. For example, the provision stipulation that pollution prevention action should be adjusted to the sound economic growth of the national economy was deleted. Nevertheless, some prefectural ordinances contain more stringent provisions than national standards. The Tokyo Metropolitan Environmental Pollution Control Ordinance contains, the Governor s obligations to determine environmental standards, conserve the natural environment, monitor and watch pollution, and publicize the names of polluters; and the entrepreneurs obligations to dispose industrial wastes, monitor, and notify. The said Ordinance, furthermore, contains requirements of acquiring permits for establishing or altering factories, the Governor s order to temporarily suspend the operation in the factories, and the right of the Governor to request suspension of water supply for industrial use. Article 27 of the Noise Regulation Law, Article 29 of the Water Pollution Control Law, and Article 32 of the Air Pollution Law authorize local governments the power to establish more stringent standards than those contained in said national laws. Where no such authorization exists but the characteristics of a region demand more stringent standards, local governments may, in the absence of express provisions for national preemption, establish more stringent regulative and performance standards.

20037 APTIC NO. 38035

Nabika, Hideyuki

THE KYOTO PREFECTURAL ENVIRONMENTAL POLLUTION CONTROL ORDINANCE. *(Kyotofu kogai boshi jorei). Text in Japanese. Jurisuto (Jurist), no. 492:185-191, Nov. 10, 1971.*

The Kyoto Prefectural Environmental Pollution Control Ordinance, consisting of a Preamble, General Provisions (Chap. 1), Control of Environmental Pollution Sources (Chap. 2), Miscellaneous Provisions (Chap. 3), and Penal Provisions (Chap. 4), was enacted on March 20, 1971. In the Preamble, the Ordinance declares that all the citizens shall have a right to enjoy an enhanced natural environment and the historical heritage as well as a right to live in healthy and comfortable surroundings; that entrepreneurs shall not injure these rights by creating any environmental pollution; and that Kyoto Prefecture shall try every possible way to prevent and eliminate environmental pollution. Preservation is sought not only for safety and health, but also for a comfortable life and scenic beauty as well as the historical and architectural heritage of an area (Art. 1 and Art. 6); crop dusting is enjoined (Art. 43); in the case where no regulation standards are provided in the Ordinance, entrepreneurs shall make every possible effort to prevent environmental pollution (Art. 19); entrepreneurs shall, in order to prevent pollution, be responsible for taking necessary measures on their own shares (Art. 2); the right to a healthy and comfortable environment shall be maintained by the constant endeavor of the citizens (Art. 8); entrepreneurs shall cooperate with each other in protecting the environment (Art. 7); and the Governor shall make public to the citizens the actual conditions of environmental pollution and the names of polluters (Art. 12).

20038 APTIC NO. 38431

Ruckelshaus, William D.

TITLE 40 -- PROTECTION OF ENVIRONMENT. CHAPTER I -- ENVIRONMENTAL PROTECTION AGENCY. SUBCHAPTER C -- AIR PROGRAMS. PART 85 -- CONTROL OF AIR POLLUTION FROM NEW MOTOR VEHICLES AND NEW MOTOR VEHICLE ENGINES. SUBPART N -- IMPORTATION OF MOTOR VEHICLES AND MOTOR VEHICLE ENGINES. *Federal Register, 37(21):2432-2433, Feb. 1, 1972.*

Regulations and procedures are set forth to implement the 1970 Clear Air Amendments pertaining to the importation of motor vehicles and motor vehicle engines. A motor vehicle or motor vehicle engine offered for importation must have certification of conformity with Federal motor vehicle emission standards, unless it is to be imported solely for purposes of testing, in which case it may be operated on the public streets for a period not exceeding 1 yr if the importer or consignee receives prior written approval from the Environmental Protection Agency.

20039 APTIC NO. 38685

Ruckelshaus, William D.

ENVIRONMENTAL PROTECTION AGENCY. MOTOR VEHICLE POLLUTION CONTROL. SUSPENSION REQUEST; NOTICE OF PUBLIC HEARING; PROCEDURES THEREFOR. *Federal Register, 37(55):5766-5767, March 21, 1972.*

A public hearing will be held in Washington, D. C. on April 10, 1972, concerning an application filed by a Swedish automobile manufacturer for 1-year suspension of the 1975 emission standards. The public hearing is intended to provide an opportunity for interested persons to state their views or arguments, or to provide pertinent information concerning the action requested of the Administrator of the Environmental Protection Agency by the applicant.

20040 APTIC NO. 37846

Shidara, M.

THE AUTHORIZED POLLUTION CONTROL MANAGER. *(Kogai boshi kanrisha to sono shikaku). Text in Japanese. Netsu Kanri (Heat Management: Energy and Pollution Control), 23(9):38-56, Sept. 1971.*

The need for the understanding, cooperation, and establishment of pollution control policies on the part of industrial management is discussed. The Public Nuisance Prevention System Law issued on June 10, 1971, and related ordinances issues on Aug. 11 and 13, 1971 by various branches of the government are summarized. With regard to authorized control managers, specific qualifications for each category of public nuisance and for various types and sizes of pollutant emitting industries are itemized. For air pollution control managers, in addition to a college degree in either chemistry, engineering, or metallurgy, three years of experience in the field and completion of special seminar courses are required; for a junior college graduate, five years of experience, and for a high school graduate, seven years of experience are required in addition to special seminar courses. In all cases, managers must pass a national test. The national board for authorized air pollution control managers includes tests concerning a general knowledge of the present situation, the historical background of pollution, characteristics of recent trends, geographical characteristics, the mechanism of air pollution, influences of air pollution on health and living environment, national and local pollution control laws and measures, terminology, combustion categories and characteristics, combustion calculations, basic preventive methods for combustion gases, stack gas desulfurization methods, dispersion principles, climactic and topographical influences on dispersion, wind tunnel tests, effective stack heights, treatment methods for toxic matter, the mechanism of pollution formation, dust collection methods, wet and dry toxic material adsorption methods, maintenance of collectors and eliminators, methods of fuel tests, various measuring equipment, measuring methods for sulfur oxides, soots, and toxic matter, and the method of operation and maintenance of measuring equipment.

20041 APTIC NO. 38690

Stronck, David R.

DIALECTIC. ENVIRONMENTAL POLLUTION AND TEXAS LAW. *Texas J. Sci., 23(3):439-445, Feb. 1972. 9 refs.*

Pollution control legislation is designed to eliminate and reduce pollution activity, not to punish polluters or to repair damages which have been done. California through its Water Code has an agency which may issue a cease-and-desist order requiring a pollution activity to be ended, but polluters are allowed much time to comply with a board order and to make the necessary changes. Florida, because of its Air and Water Pollution Control Act of 1967, is one of the few states which holds polluters liable for the damage caused to waters and fish and for expenses required to restore the waters to their former state. While direct regulation remains rather ineffective, the government is tending to provide increasing subsidies and payments to polluters as an incentive to improve their waste management practices. The basic philosophy of the Texas Water Quality Act and Clean Air Act centers on persuading offenders to cease polluting the environment voluntarily. The 61st Legislature has amended the Texas Clean Air to make it much stronger. Under the old law, the Board could not frame a rule or regulation to control air pollution emissions that did not cross the boundaries of the property on which the source was located. However, the present pollution control agencies in Texas lack funds, personnel, and appropriate organization to meet the needs of the citizens.

20042 APTIC NO. 38217

Tinker, Jon

BRITAIN S ENVIRONMENT -- NANNY KNOWS BEST. *New Scientist, 386(53):530-534, March 9, 1972.*

In Great Britain, airborne or liquid emissions from each individual factory have to be authorized by a national or local regulating agency -- but the permitted limits are kept secret. Pollution officers have the power to take samples of industrial discharges to make sure that they comply with these secret limits -- but the analysis of the samples remains strictly confidential. Even environmental monitoring data are concealed. This mania for preserving industrial secrecy at the risk of public health is being challenged by conservation groups and members of the scientific community, especially those whose research into pollution problems is handicapped by official secrecy. A technical audit scheme proposed by the Council of Scientific and Technical Institutes would require all plants to issue an annual report detailing precise emission levels to air and water and describing the disposition of plant waste. The audit would be signed by consulting engineers, who would have to certify that the best practicle means were being used to reduce pollution.

20043 APTIC NO. 37868

Wiethaup, Hans

THE LEGAL SITUATION OF UNPERMISSIBLE EMISSIONS FROM REFUSE DUMPS. *(Zur Rechtslage bei unzulaessigen Immissionen von Muellplaetzen). Text in German. Med. Klin. (Munich), 67(11):392-394, March 1972. 10 refs.*

Recent statistics have shown that more than 90% of the refuse is still dumped by the most primitive method. The 50,000 wild refuse dumps all over West Germany are mostly located in the center of dense residential areas. Such dumps emit methane gas, dust, and gases from low-temperature combustion. An avalanche-like increase of the refuse is expected for the whole country. At the moment a minimum of 400 kg refuse is produced/capita/yr in the Federal Republic of Germany. The law gives each resident the right to request the elimination of dust and gas emission carried from wild or, in some cases, sanitary dump sites to his plot. If the emissions have caused damage to property or the health of a resident, payment of indemnities can be requested. A proof for the connection of the damage with the emissions caused by the dumps must be furnished.

SOCIAL ASPECTS

20044 APTIC NO. 38673

Osaka Prefectural Housing Project (Japan)

PUBLIC NUISANCE INVESTIGATION IN RESIDENTIAL AREAS - FEBRUARY 1971. *(Jutakuchi ni okeru kogai chosa - 46-nen 2 gatsu). Text in Japanese. Kankyo Hakai (Environ. Destr.), 2(12):65-66. Oct. 1971.*

Inquiries were made by questionnaires at a prefectural housing project (apartment building) which houses 220 families. The apartment is surrounded by a number of electrical engineering, metal, chemical, gas, glass manufacturing industries and busy highways. The 1968 average of suspended particulates in the area was 0.131 mg/cu m, which rose to 0.163 mg/cu m in 1969. The measurements were taken by high volume air samplers. The electroconductivity measurement of sulfur dioxide averaged in 1968 at 0.067 ppm, and 0.065 ppm in 1969. Responses were made by 207 families. To the question pertaining to the categories of public nuisance which annoyed them, 61.8% answered to noise and vibration, 70% answered to air pollution, 61.8% answered to bad odor. As to the actual descriptions of nuisances, 45.4% complained of continuous and intermittent noise, 64.7% complained of stack gas and automotive exhaust gas, 29.0% complained of dusts, and 8.7% complained of industrial waste water pollution. With regards to the effects on health, 46.4% complained of irritation of nerves, 7.7% lack of appetite, 59.9% irritations, of eye, nose and throat, 46.4% susceptibility to colds, 50.2% coughing, 41.5% headaches, and 21.7% breathing difficulties. With regards to material damages, 63% complained of soiled laundry and furniture, 24.2% corrosion of metals, 20.3% radio and television interferences, and 19.3% damages on trees and plants.

20045 APTIC NO. 38675

Public Nuisance Problems Study Group (Japan)

INVESTIGATION OF THE CONSCIOUSNESS OF PUBLIC NUISANCE AMONG WORKERS OF DENTSU. MAY-JUNE 1971. *(Zen-dentsu rodosha no kogai ishiki chosa - 46 nen 5 gatsu - 6 gatsu). Text in Japanese. Kankyo Hakai (Environ. Destr.), 2(12):6-37, Oct. 1971.*

Questionnaires were given to 1500 workers of Dentsu (telecommunication industries) of Kawasaki, Muroran, and Kurashiki cities between May 24 and June 12, 1971, to investigated their awareness of various aspects of public nuisance. With regards to the prospect of public nuisance in the future, 90% gave a pessimistic answer. There was a marked difference between the answers given by outdoor workers and indoor workers. In all three cities, 6 to 8% more indoor workers predicted an extremely pessimistic situation in worsening of living conditions due to pollution. However, 67.4% claimed positive damages of public nuisance, and 22.4% denied the existance of public nuisance as such. Among the positive damage answers, 34.3% claimed the existence of air pollution, 10.9% water pollution, 10.8% noise, 4.4% vibration, 4.6% bad odor, 0.4% settling of grounds. The largest segment, 21.7% complained of lack of sleep and unpleasantness, 10% of soiled laundry, 2.9% of damages to the house and furniture, 3.8% of damages to animals and plants, 8.4% damages to human health. Other questions dealt with the workers opinions for the future government policies against public nuisance, and with the responsibilities of the government, local governments, and industries.

GENERAL

20046 APTIC NO. 38191

Calvert, Seymour

REVIEW OF AIR POLLUTION (1960-1962). *Chem. Eng. Progr. Symp. Ser., 59(45):66-70, 1963. 109 refs.*

The major concerns of air pollution control technology are summarized, and sources of air pollution information useful to the chemical engineer are listed. Included are general texts, bibliographies, symposia proceedings, surveys and a selected bibliography of papers published between 1960-1962. These papers covered such subjects as criteria for air zoning, source sampling, the effects of pollutants on health and materials, the nature of pollutant dispersion, smog-forming reactions, new uses of adsorption, particulate analysis, particle adhesion, and particle collection.

20047 APTIC NO. 38550

Fersen, Olaf von

ELABORATE ENGINES FOR THE MASS PRODUCTION. OVERHEAD CAMSHAFTS BECAME CUSTOMARY - THE IMPACT OF EXHAUST GAS REGULATIONS WAS SLIGHT - PART I. *(Aufwendige Motoren fuer die Grosserie. Obenliegende Nockenwellen wurden ueblich - Nur geringe Auswirkung der Abgasvorschriften - 1. Teil). Text in German. VDI (Ver. Deut. Ingr.) Nachr. (Berlin), 25(51):18, 19, Dec. 1971.*

Few new car models came out in 1971 since people wanted to see in which direction the exhaust gas legislation would go. The last year of great innovations was 1970. Construction principles which in the past were a prerogative of sports cars were used for mass production cars. In the future no such great engine innovations can be expected any more because of the more stringent emission limits which will go into effect. Overall there was little concern about exhaust gas emissions in the past, with the exception of the Vega four-cylinder engine. The low compaction ratio 8.0:1 and the conical shape of the combustion chamber were designed to achieve a reduction of pollutants.

20048 APTIC NO. 38326

Summer, W.

METHODOLOGY OF ENVIRONMENTAL CLEANING. *(Methodologie der Umweltreinigung). Text in German. Wasser Luft Betrieb, 15(12):455-457, Dec. 1971.*

Every pollutant present in the air penetrates into the body. Only a few industrial pollutants are noticed by our senses. Air pollutants can be divided into two classes: aerosols and mists; and gases and vapors. A special aspect of air pollution is the odor pollution which can be eliminated by oxidation. The most active oxidizing agent is oxygen in the status nascendi. Oxygen particles are very short-lived, thus nascenting oxygen must be produced in the polluted flow of air. For the oxidation of the pollutants, a short residence time of 7 sec on the average is required. Other measures are required for general air pollution. They will become even more mecessary in the future. In thirty years there will be twice as many people as today and at least twice the number of combustion engines of all sorts consuming enormous quantities of oxygen and producing toxic exhaust gases.

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*19678 APTIC NO. 38320

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*19901 APTIC NO. 37898

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19531 APTIC NO. 38297

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*19282 APTIC NO. 38367

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*19482 APTIC NO. 38385

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•19681 APTIC NO. 38429

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19632 APTIC NO. 38188

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•19819 APTIC NO. 37901

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•19820 APTIC NO. 38659

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•19485 APTIC NO. 38276

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•19283 APTIC NO. 38283

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*19783 APTIC NO. 38529

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*19285 APTIC NO. 38543

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*19491 APTIC NO. 38194

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*19975 APTIC NO. 38417

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*19498 APTIC NO. 38471

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*19288 APTIC NO. 38595

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*20002 APTIC NO. 38409
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19895 APTIC NO. 37964

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*19977 APTIC NO. 38404

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*19502 APTIC NO. 38661

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*19504 APTIC NO. 37821

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*19825 APTIC NO. 37951

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19916 APTIC NO. 38198
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*19978 APTIC NO. 37926

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*19826 APTIC NO. 38585

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*19979 APTIC NO. 38419

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